Oregon State University

BULLETIN Catalog Issue 1974-75

A member of the
Oregon State System of Higher Education

OREGON STATE UNIVERSITY
Corvallis, Oregon 97331

Telephone: Area Code 503-754-0123
Postal zip code for campus residences: 97332

For a complete directory of campus offices and departments, see inside back cover

Admitted students are given a copy of this General Catalog at no cost. They may obtain additional copies at the Registrar's Office at $1 a copy. There is no charge for other catalogs.

Where to obtain Catalogs

General Catalog	Office of the Registrar
Graduate Catalog	Graduate School Office
General Information Bulletin	Office of Admissions
Summer Term Catalog	Summer Term Office

cover design by Marilyn Holsinger

OREGON STATE UNIVERSITY BULLETIN

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Catalog 1974-75

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Summer Term, 1974

June 17, *Monday* ..... Registration
June 18, *Tuesday* ..... Classes begin
July 4, *Thursday* ..... Independence Day—holiday
August 9, *Friday* ..... End of eight-week courses
August 30, *Friday* ..... End of eleven-week courses

Fall Term, 1974

September 23-29, *Monday-Sunday* ..... New student orientation-advising
September 26, *Thursday* ..... Registration (all students)
September 30, *Monday* ..... Schedule distribution
October 1, *Tuesday* ..... Classes begin
October 14, *Monday* ..... Latest day for registering, paying fees, or adding courses
October 25, *Friday* ..... End of fourth week (reports of unsatisfactory progress)
November 8, *Friday* ..... Latest day to drop a course
November 22, *Friday* ..... Latest day to withdraw from college without responsibility for grades
November 28-December 1, *Thursday-Sunday* ..... Thanksgiving vacation
December 10, *Tuesday* ..... Preregistration (currently enrolled students)
December 16-21, *Monday-Saturday* ..... Final week
December 21, *Saturday* ..... End of fall term

Winter Term, 1975

January 6, *Monday a.m.* ..... Schedule distribution
January 6, *Monday p.m.* ..... Registration (new students and others not eligible for preregistration)
January 7, *Tuesday* ..... Classes begin
January 20, *Monday* .... Latest day for registering, paying fees, or adding courses
January 31, *Friday* ..... End of fourth week (reports of unsatisfactory progress)
February 14, *Friday* ..... Latest day to drop a course
February 21, *Friday* ..... Latest day to withdraw from college without responsibility for grades
March 11, *Tuesday* ..... Preregistration (currently enrolled students)
March 17-22, *Monday-Saturday* ..... Final week
March 22, *Saturday* ..... End of winter term

Spring Term, 1975

March 31, *Monday a.m.* ..... Schedule distribution
March 31, *Monday p.m.* ..... Registration (new students and others not eligible for preregistration)
April 1, *Tuesday* ..... Classes begin
April 14, *Monday* ..... Latest day for registering, paying fees, or adding courses
April 25, *Friday* ..... End of fourth week (reports of unsatisfactory progress)
May 9, *Friday* ..... Latest day to drop a course
May 16, *Friday* ..... Latest day to withdraw from college without responsibility for grades
May 26, *Monday* ..... Memorial Day—holiday
June 8, *Sunday* ..... Commencement
June 9-14, *Monday-Saturday* ..... Final week
June 14, *Saturday* ..... End of spring term

Summer Term, 1975

June 23, *Monday* ..... Registration
June 24, *Tuesday* ..... Classes begin
July 4, *Friday* ..... Independence Day—holiday
August 15, *Friday* ..... End of eight-week courses
September 1, *Monday* ..... Labor Day—holiday
September 5, *Friday* ..... End of eleven-week courses

Fall Term, 1975

September 22-28, *Monday-Sunday* ..... New student orientation-advising
September 25, *Thursday* ..... Registration
September 30, *Tuesday* ..... Classes begin
November 27-30, *Thursday-Sunday* ..... Thanksgiving vacation
December 20, *Saturday* ..... End of fall term

Any changes in the Calendar will be announced in the *Schedule of Classes*.

FEBRUARY 1975

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JUNE 1975

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JULY 1975

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AUGUST 1975

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SEPTEMBER 1975

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Oregon State System of Higher Education

The Oregon State System of Higher Education, organized in 1932, provides educational opportunities to young people and adults throughout the State of Oregon. Member institutions are elements of an articulated system, parts of an integrated whole.

Opportunities for general education are distributed as widely as possible throughout the state, while specialized, professional, and technical programs are centered at specific institutions.

Members of the Oregon State System of Higher Education are:

Oregon State University	Corvallis
University of Oregon	Eugene
Portland State University	Portland
Oregon College of Education	Monmouth
Southern Oregon College	Ashland
Eastern Oregon State College	La Grande
Oregon Institute of Technology	Klamath Falls

The University of Oregon Medical School, including the University of Oregon School of Nursing, and the University of Oregon Dental School are located in Portland. The Division of Continuing Education represents all the institutions in making college-level courses and special programs available to all citizens. The Division has offices in Salem, Astoria, and Coos Bay as well as on most OSSHE campuses.

An interinstitutional booklet, "It's Your Decision," lists fields of study at all State System institutions, and gives other important information for prospective students. For a free copy, write "It's Your Decision," State Board of Higher Education, P. O. Box 3175, Eugene, Oregon 97403.

*State Board of Higher Education**

	Term expires
Elizabeth H. Johnson, Redmond	1974
Marc Maden, PSU Student, Portland	1974
Valerie McIntire, UO Student, Eugene	1975
John W. Snider, Medford	1975
George H. Corey, Pendleton	1975
Philip A. Joss, Portland	1976
George Layman, Newberg	1976
John Mosser, Portland	1976
Robert D. Holmes, Seaside	1977
Loran L. Stewart, Eugene	1977
Edward G. Westerdahl II, Portland	1977

Officers

George Layman ..... President and Chairman, Executive Committee

John W. Snider ..... Vice President, Member Executive Committee

George H. Corey..Member, Executive Committee

Roy E. Lieuallen.....Chancellor

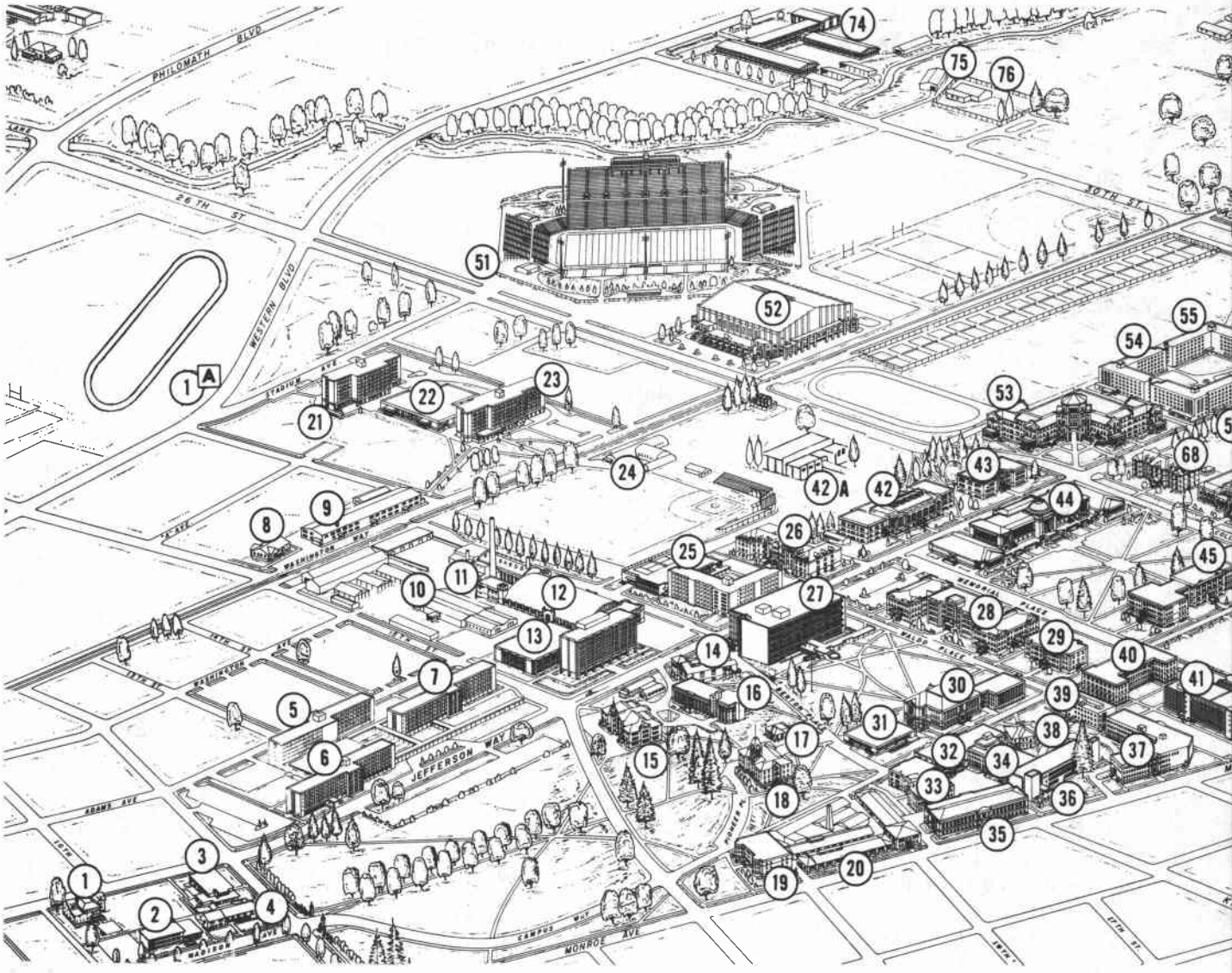
Donald R. Larson ..... Secretary of Board

Former Chancellors

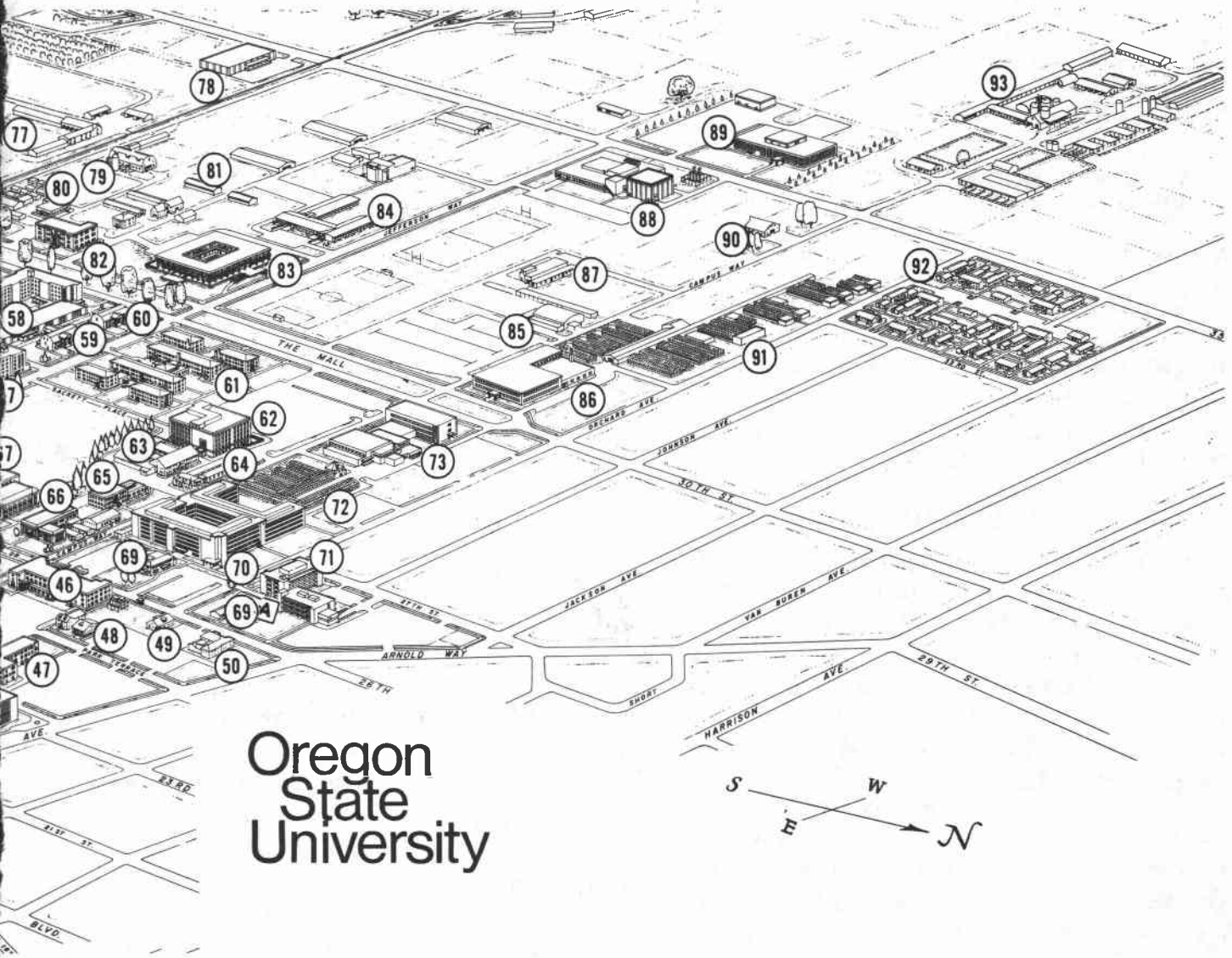
William J. Kerr, D.Sc., LL.D.	1932-1935
Frederick M. Hunter, Ed.D., LL.D.	1935-1946
Paul C. Packer, Ph.D., LL.D.	1946-1950
Charles D. Byrne, Ed.D.	1950-1955
John R. Richards, Ph.D.	1955-1961

Office of the State Board of Higher Education
Post Office Box 3175
Eugene, Oregon 97403

* Board members are appointed to four-year terms by the Governor of Oregon, with confirmation by the State Senate. Terms are four years for regular members and two years for student members. Terms expire June 30.



ALPHABETICAL LISTING



NUMERICAL LIST

1 Oxford House
1A Spring Sports Complex
2 Avery Lodge
3 Dixon Lodge
4 Azalea House
5 Wilson Hall
6 McNary Hall & Dining Hall
7 Callahan Hall
8 Physical Plant Office Building
9 Industrial Building
10 Physical Plant Shops
11 Heating Plant
12 McAlexander Fieldhouse
13 Administrative Services Building
14 Mitchell Playhouse
15 Education Hall
16 Pharmacy Building
17 Paleontology Laboratory
18 Benton Hall
19 Apperson Hall
20 Production Technology Building
21 Bloss Hall
22 Arnold Dining Hall
23 Finley Hall
24 Naval ROTC Armory
25 Snell Hall & Dining Hall
26 Waldo Hall
27 Kerr Library
28 Agriculture Hall
29 Social Science Hall
30 Kidder Hall
31 Milne Hall (Computer Center)
32 Batcheller Hall
33 Covell Hall
34 Dearborn Hall
35 Graf Engineering Laboratory
36 Rogers Hall
37 Gilbert Hall
38 Shepard Hall
39 Chemical Engineering Building
40 Bexell Hall
41 Weniger Hall
42 Langton Hall
42A Dixon Recreation Center
43 Moreland Hall
44 Memorial Union
45 Home Economics Building
46 Extension Hall
47 Plageman Hall
48 Park Terrace Child Dev. Center
49 Kent House
50 Coed Cottage
51 Parker Stadium
52 Gill Coliseum
53 Weatherford Hall & Dining Hall
54 Poling Hall
55 Cauthorn Hall
56 Buxton Hall
57 Hawley Hall
58 West Hall & Dining Hall
59 Heckart Lodge
60 Reed Lodge
61 Sackett Hall
62 Nash Hall
63 Agricultural Utilities Building
64 Farm Crops Annex
65 Farm Crops Building
66 Gilmore Hall and Annex
67 Women's Building
68 Fairbanks Hall
69 Orchard Street Child Dev. Center
69A Earth Sciences
70 Cordley Hall
71 Oceanography Buildings
72 Greenhouses—East
73 Withycombe Hall
74 Forest Research Laboratory
75 Aero Jet Laboratory
76 Cyclotron Building
77 Veterinary Sheep Barn
78 Dormitory Service Building
79 Veterinary Dairy Barn
80 Veterinary Diagnostic Laboratory
81 Poultry Science Research Facility
82 Dryden Hall
83 Peavy Hall (Forestry)
84 Forestry Sciences Laboratory (USDA)
85 University Motor Pool
86 Wiegand Hall
87 Clark Laboratory
88 Radiation Center and Nuclear Reactor
89 National Environmental Research Ctr.
90 Farrier's School Building
91 Greenhouses—West
92 Orchard Court Apartments
93 Animal Science Research Farm

Administration

Principal Administrative Offices

President ..... Robert W. MacVicar, Ph.D.
Assistant to the President .... Wilmer H. Post, M.B.A.
Assistant to the President .....
Forrest Evashevski, Jr., J. D.
Vice-President for Research and Graduate Studies .....
Roy A. Young, Ph.D.
Associate Dean ..... Wayne V. Burt, Ph.D.
Dean of Administration ..... Milosh Popovich, M.S.
Dean of Faculty ..... David B. Nicodemus, Ph.D.
Dean of the Graduate School ..... Emery N. Castle, Ph.D.
Dean of Students ..... Robert W. Chick, Ed.D.
Dean of Undergraduate Studies .... Stuart E. Knapp, Ph.D.

School, College, and Division Heads

Liberal Arts ..... Dean Gordon W. Gilkey, Arts D.
Science ..... Dean Robert W. Krauss, Ph.D.
Agriculture .... Dean and Director Wilbur T. Cooney, M.S.
Business and Technology .... Dean Earl E. Goddard, D.B.A.
Education ..... Dean Stanley E. Williamson, Ed.D.
Engineering ..... Dean Fredrick J. Burgess, M.S.
Forestry ..... Dean Carl H. Stoltenberg, Ph.D.
Health and Physical Education .....
Director James W. Long, Ph.D.
Home Economics ..... Dean Betty E. Hawthorne, Ph.D.
Oceanography ..... Dean John V. Byrne, Ph.D.
Pharmacy ..... Dean Charles O. Wilson, Ph.D.
Aerospace Studies .... Col. Charles G. Memminger, M.S.
Military Science ..... Colonel Ejner J. Fulsang, Jr., M.S.
Naval Science ..... Capt. Charles G. Dimon, M.S.

Instructional Services

Admissions and Registrar .....Wallace E. Gibbs, Ed.M.,
Director and Registrar
Classroom Television .... Harold M. Livingston, Ph.D.,
Director
Curriculum Committee .....
J. Frank Ligon, Jr., Ph.D., *Executive Secretary*
Educational Opportunities ..... David Valencia, B.S.,
Acting Director
Exploratory Studies Program .... Morris L. LeMay, Ed.D.,
Director
Honors Program ..... Leonard J. Weber, M.S., *Director*
Instructional Resources and Materials Center .....
Benjamin P. Purvis, Ph.D., *Director*
International Education .....
Gordon R. Sitton, Ph.D., *Director*
Libraries ..... Rodney K. Waldron, M.A., *Director*
Summer Term ..... Robert L. Phillips, Ph.D., *Director*
and Asst. to Pres. for Continuing Educational Services

Student Services

Career Counseling and Placement .....
Louis L. Edwards, M.E., *Director*
Counseling Center ..... Morris L. LeMay, Ed.D.,
Associate Dean
Financial Aid ..... Richard E. Pahre, M.A., *Director*
General Student Services ..... JoAnne Trow, Ph.D.,
Associate Dean
Housing ..... M. Edward Bryan, M.Ed., *Director*
Memorial Union ..... George F. Stevens, M.Ed.,
Associate Dean
New Student Program .... J. Franz Haun, Ed.D., *Director*
Student Health Service ..... William P. Stephan, M.D.,
Director

General Institutional Services

Affirmative Action ..... Ronald McClain, *Director*
and Assistant to the President
Alumni Relations .... Crawford H. Graham, B.S., *Director*
Computer Center ..... Larry C. Hunter, Ph.D., *Director*
Budget and Personnel Services .. Richard C. Greenwood,
B.S., *Director*
Business Affairs ..... Hugh F. Jeffrey, B.S., *Director*
Information Department .....
Samuel H. Bailey, M.S., *Director*
Intercollegiate Athletics .....
James G. Barratt, B.S., *Director*
Physical Plant ..... Everett H. Lillig, B.S., *Director*
Planning and Institutional Research .....
George E. Thornburgh, M.S., *Director*
Printing Department ..... Charles W. Peckham, B.S.,
Director
Publications Office .....
J. Kenneth Munford, Ed.D., *Director*
University Development .....
James W. Dunn, M.S., *Development Officer*
University Motor Pool .... Cecil B. Barnett, M.S., *Director*

For additional members of Library staff see page 9; for additional Student Services staff see page 17.

GENERAL INFORMATION

Charter

Federal Land-Grant (Morrill) Act, July 2, 1862

. . . Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there be granted to the several States, for the purposes hereinafter mentioned, an amount of public land, to be apportioned to each State . . . And be it further enacted, That all moneys derived from the sale of lands aforesaid, by the States . . . shall constitute a perpetual fund . . . the interest of which shall be inviolably appropriated by each State . . . to the endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the Legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life . . .

Act accepted by Oregon Legislature, October 9, 1862

. . . each and all of the propositions in said act of Congress offered to the State of Oregon are hereby irrevocably adopted, with all the conditions and obligations therein contained . . .

Corvallis College Incorporated August 22, 1868

The name . . . Corvallis College . . . is not limited in duration . . . The object of this incorporation is to . . . endow, build up, and maintain an institution for educational purposes and to confer all such honors, distinctions, and degrees usual in colleges.

Designated Land-Grant institution, October 27, 1868

. . . Until other provision can be made, the Corvallis college is hereby designated and adopted as the agricultural college, in which all students sent under the provisions of this title shall be instructed in all the arts, sciences, and other studies, in accordance with the requirements of the acts of Congress.

Action of October 27, 1868, made permanent, October 21, 1870

Corvallis College, in Benton County, is hereby designated and permanently adopted as the Agricultural College of the State of Oregon.

Full State control, February 11, 1885

. . . the permanent location of the State Agricultural College at Corvallis, in Benton County . . . is hereby ratified and confirmed.—Provided . . . that the general government of the said College shall be vested in . . . a board of Regents of the State Agricultural College of the State of Oregon.

State Board established, March 1, 1929:

There hereby is created a . . . department of higher education . . . under the control of . . . the state board of higher education, [which] . . . shall succeed to and hereby is invested with all the powers and duties . . . of the board of regents of the Oregon State Agricultural College.

Name changed, April 15, 1953:

. . . and such college shall be named Oregon State College (ORS 352.230).

Designated Oregon State University, March 6, 1961

ORS 352.230 is amended to read: Any reference to Oregon State College in the laws of Oregon is intended to be and shall be deemed to be a reference to Oregon State University.

History

Oregon State University started as an academy incorporated as Corvallis College in 1858. College-level study began about the time the Reverend W. A. Finley became president in 1865. By 1870, two men and one woman had fulfilled requirements for the baccalaureate degree and became the first graduates of a state-assisted college in the Far West.

Oregon had made an earlier attempt—before statehood—to establish a public university. In 1851 the Legislature of Oregon Territory, comprising the vast area from California to Canada and from the Rocky Mountains to the Pacific Ocean, designated Corvallis (then called Marysville) as the site of the territorial university. Building materials were assembled on the selected site (where Extension Hall now stands), but before construction began, the Legislature of 1855 changed the location of the university to Jacksonville and ordered the building materials sold.

Oregon as a state began its assistance to higher education on October 27, 1868, when it designated Corvallis College "the agricultural college of the State of Oregon." In taking this action the Legislative Assembly accepted the provisions of the First Morrill Act, which President Lincoln had signed on July 2, 1862. This Act provided grants of land to be used by the states for the sole purpose of endowing, supporting, and maintaining publicly controlled colleges. The Congress defined the purpose of the land-grant institutions in these words: "The leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life." The Oregon Legislature directed that "all students sent under the provisions of this Act shall be instructed in all the arts, sciences, and other studies in accordance with the Act of Congress."

Another event makes the year 1868 especially significant. In August of that year Corvallis College was again incorporated, this time on a basis "not limited in duration but perpetual." This institution, maintained by the Methodist Episcopal Church, South, was partly state supported from 1868 to 1885, when the State assumed complete control.

Subsequent Federal legislation—notably the Hatch Act of 1887, the Second Morrill Act of 1890, and the Smith-Lever Act of 1914—provided further for the teaching function of the institutions and also for programs of research and extension.

Corvallis College originally occupied a site on Fifth Street between Madison and Monroe. A 35-acre farm, part of the present campus, was purchased in 1870. The College moved to the present campus, occupying Benton Hall, a gift of the citizens of Benton County, in 1888.

The curriculum of Corvallis College, typical of the liberal arts colleges of the period, provided a classical course leading to the Bachelor of Arts degree and a scientific course leading to the Bachelor of Science degree. The curriculum began to expand under the impetus of the land-grant act. Agriculture, largely conducted in the Department of Chemistry, was added in 1869. Four professorships (commerce, 1880, agriculture, 1883, household economy, 1889, and engineering, 1889) grew into departments and resulted in the establishment in 1908 of four professional schools: Agriculture, Commerce, Engineering, and Home Economics. Schools added later included Forestry, 1913; Mines, 1913; Pharmacy, 1917; Education, 1918; Basic Arts and Sciences, 1922; and Health and Physical Education, 1931. The first

Summer School was held in 1908. Extension work had its beginnings in 1889 when farmers institutes were held at four places in the State.

In 1932, the State Board of Higher Education established the School of Science for the State System at Corvallis, eliminated the School of Mines, and reduced the School of Health and Physical Education to a Division. Major work in business administration was discontinued, but was reinstated when the School of Business and Technology was established (first as a Division) in 1943. The College of Liberal Arts was established (as the School of Humanities and Social Sciences) in 1959.

The first advanced degree (A.M.) was awarded in 1876. A committee on advanced degrees appointed in 1910 began to lay the foundations of the Graduate School. The first Ph.D. degrees were conferred in 1935.

Research programs at OSU are coordinated through the office of the Vice President for Research and Graduate Studies. Research activities include individual projects carried on as a part of normal academic activity in the various disciplines and departments; projects conducted in the Agricultural Experiment Station, the Forestry Research Laboratory, and Sea Grant Program; and interdisciplinary projects coordinated through the research centers and institutes. The various research units are described in the RESEARCH section of this catalog.

Presidents of the institution since its founding are: W. A. Finley, 1865-72; B. L. Arnold, 1872-92; John M. Bloss, 1892-96; H. B. Miller, 1896-97; Thomas M. Gatch, 1897-1907; William Jasper Kerr, 1907-32; George Wilcox Peavy, 1934-40; Frank Llewellyn Ballard, 1940-41; Francois Archibald Gilfillan, 1941-42; August Leroy Strand, 1942-61; James Herbert Jensen, 1961-69; Roy Alton Young, 1969-70; Robert William MacVicar, 1970-.

Accreditation

Oregon State University is accredited by the Northwest Association of Secondary and Higher Schools. The departments of Chemistry and Chemical Engineering are approved by the American Chemical Society. The School of Business and Technology received full accreditation by the American Association of Collegiate Schools of Business in 1960. Also in 1960, the School of Education was granted full accreditation of its program for preparation of elementary teachers, secondary teachers, and school service personnel (guidance counselors) with a doctor's degree as the highest degree approved. Nine curricula in the School of Engineering are approved by the Engineers' Council for Professional Development. The School of Forestry is one of the 27 schools accredited by the Society of American Foresters. The School of Pharmacy has been accredited since 1929 by the American Council on Pharmaceutical Education.

Campus

The city of Corvallis, in which Oregon State University is located, has a population of 36,700. It lies in the heart of the Willamette Valley between the Cascade Mountains on the east and the Coast Range on the west, 80 miles south of Portland. The climate is mild and equable with rainfall averaging about 30 inches annually.

The 400-acre main campus has grown out of plans prepared by the eminent landscape architects John C. Olmstead (1908) and A. D. Taylor (1925, 1945). The current plan for campus development was initiated in 1962 by Louis A. DeMonte of the firm of DeMonte and Wagner, University Planning Consultants, and approved by the State Board of Higher Education in 1964. It takes into consideration the nature and aims of the University, anticipated enrollment, density of land use, building location and heights, parking space, and the expanding role of the University in service to the State.

Present buildings, with dates of original construction and later additions or major remodeling, are listed below. For temporary buildings the dates indicate either date of erection or date of purchase for Oregon State University use.

Administrative Services (1971)
Aero Engine Laboratory (1953)
Agricultural Utilities (1909)
Agriculture Hall (1909, 1911, 1913)
Apperson Hall (1898, 1920, 1950, 1963)
Arnold Hall (1971)
Avery Lodge (1966)
Azalea House (1953)
Batcheller Hall (1913)
Benton Hall (1888)
Bexell Hall (1922, 1958)
Bioscience (1970)
Bloss Hall (1971)
Buxton Hall (1961)
Callahan Hall (1964)
Cauthorn Hall (1957, 1963)
Chemical Engineering Building (1955)
Coed Cottage (1926, purch. 1956)
Cordley Hall (1957, 1967)
Covell Hall (1928, 1960)
Cyclotron (1952)
Dairy Barn (1968)
Dearborn Hall (1949)
Dixon Lodge (1966)
Dormitory Service Building (1961)
Dryden Hall (1927)
Earth Science (1972)
Education Hall (1902, 1940)
Environmental Fluid Dynamics Laboratory (1973)
Extension Hall (1921, 1951)
Fairbanks Hall (1892, 1936)
Farm Crops (1919, 1924, 1951)
Farrier's School (1915, 1965)
Finley Hall (1967)
Food Technology (1951)
Forest Research Laboratory (1961, 1968, 1970)
Forest Science Laboratory (1962, 1971)
Forestry (1917)
Gilbert Hall (1939)
Gill Coliseum (1950)
Gilmore Hall (1912, 1939)
Graf Engineering Laboratory (1920)
Greenhouses (1928, 1951, 1954, 1957, 1964, 1966)
Hawley Hall (1959, 1963)
Heating Plant (1923, 1949, 1953, 1960, 1966, 1970)
Heckart Lodge (1954)
Home Economics (1914, 1920, 1952)
Horse Center (1971)
Industrial Building (1947, 1958)
Kent House (purch. 1924)
Kerr Library (1963), (1971)
Kidder Hall (1918, 1941, 1966)
McAlexander Fieldhouse (1910, 1971)
McNary Hall (1963)
McNary Dining Hall (1963)
Marine Science Center at Newport (1965, 1970)
Meats Laboratory (1967)
Memorial Union (1928, 1960)
Men's Gymnasium (1915, 1921, 1953)
Milne Hall (1970)
Mitchell Playhouse (1898, 1950)
National Environmental Health Center (1966)
Naval ROTC Armory (1946, 1954, 1959)
Nuclear Reactor (1967)
Oceanography Buildings (1964, 1970)
Oceanography CORE Laboratory (1972)
Oceanography Geophysics Laboratory (1972)
Oceanography Machine Shop (1971)
Oceanography Warehouse (1972)
Orchard Court Apartments (1961, 1963)
Orchard Street Nursery School (1939)
Paleontology Laboratory (1892)
Park Terrace Nursery School (1918, purch. 1945)
Parker Stadium (1953, 1967, 1969)
Peavy Hall (Forestry) (1971)
Pharmacy (1924, 1966)
Physical Plant Office (1961)
Physical Plant Warehouse (1948, 1952)
Plageman Hall (1936, 1961)
Poling Hall (1957, 1963)
Production Technology (1908, 1949, 1963)
Radiation Center (1964, (1967), (1972)
Reed Lodge (1954)
Rogers Hall (1967)
Sackett Hall (1947, 1963)
Shepard Hall (1908)
Snell Hall (1959)
Snell Dining Hall (1959)
Social Science Hall (1912, 1951)
Spring Sports Complex (1973)
Swine Barn (1965)
University Motor Pool (1954)
Veterinary Dairy Barn (1930)
Veterinary Diagnostic Laboratory (1952, 1961, 1972)
Veterinary Sheep Barn (1938, 1962)
Waldo Hall (1907, 1959)
Weatherford Dining Hall (1957)
Weatherford Hall (1928)
Weniger Hall (1959, 1961, 1966)
West Hall (1960)
West Dining Hall (1960)
Wilson Hall (1964)
Withycombe Hall (1952)
Women's Building (1926)

In addition to the main campus, the State also owns and leases many acres of forest and farm land which are used for instruction and research. For more information see School of Forestry, Cooperative Extension Service, and Agricultural Experiment Station.

William Jasper Kerr Library

Director of Libraries ..... RODNEY K. WALDRON, M.A.
Associate Director ..... ROBERT M. DONNELL, M.A.
Serials Librarian ..... ROSE MARIE LOMONTE, M.S. in L.S.
Acquisitions Dept. .... STANLEY SWANSON, B.A., M.Ed., M.A.L.S.
NANCY WEBBER, M.L.S.
Catalog Librarian ..... HELEN HORVATH, M.A., M.S. in L.S.
Social Science, Humanities, and Business Librarian .....
STEPHENS T. F. SHOU, M.A., M.A. in L.S.
Acting Science and Technology
Librarian ..... LORA I. KELTS, B.A., Cert. in L.S.

The William Jasper Kerr Library, now containing 693,000 volumes, is housed in a modern six-story building providing space for an estimated 875,000 volumes and 2,700 readers. Books are, with a limited number of exceptions, on open shelves directly available to faculty and students.

The Library is arranged in two major subject divisions. The first four floors comprise the Social Science, Humanities, and Business Division. Located on the first floor are the newspapers, U. S. and U. N. publications, and the Reserve Book Room.

The second (main) floor houses the general periodicals and subject areas of philosophy, psychology, and history. The reference services for the division are located on this floor along with the main card catalog for the entire library. The Central Circulation desk for the building is also on this main floor.

The third floor is occupied by administrative, acquisition, and cataloging offices and resources in the social sciences, political sciences, economics, and law.

The fourth floor houses material in the fields of education, literature, music and art. The Curriculum Library and the Special Collections room are also on this floor.

The Science-Technology Division is located on floors five and six. The fifth floor contains the reference services of the division which include a card catalog of the materials on the top two floors. On the fifth floor are the collections in theoretical and applied science, and floor six contains those in agriculture, forestry, pharmacy, and engineering. Carrels for Ph.D. candidates and faculty, individually assigned on a term basis, are provided on all floors. Each floor has a conference room for use of undergraduates and others. All book collections are under the direction of subject specialists.

Collections. The books in the Library and the 28,000 or more volumes added annually are closely coordinated with teaching and research. The collections are therefore primarily technical and scientific, although substantial increases are being made in books for the humanities and social sciences. Subjects in which special strength has been developed are textiles, costume design, nutrition, mathematics, horticulture, taxonomy, and oceanography. Collections of some distinction are also being built in biology, food technology, chemistry, plant pathology, mycology, and entomology. Over 6,200 periodicals are received currently. These periodicals represent a portion of the 19,700 total serials received by the Library. A major portion of the Library's holdings are consequently bound serials. Newspapers received currently, a number of which are on microfilm, total 190. The Library has one of the more comprehensive map collections in the Northwest. This ever-growing collection now contains about 117,000 maps.

Like most large libraries, the Library is a general depository for publications of the U.S. Government. In addition, it has been designated as a depository for specific types of materials: Military and Federal Specifications and Standards, publications and maps of the Army Map Service, repository for materials emanating from research and investigations under the Anadromous Fish Act, and the Commercial Fisheries Research and Development Act. Formerly a depository for the U.S. Atomic Energy Commission, this service was discontinued a short time ago and materials from the USAEC must be purchased. In addition to the U. S. Government publications, the Library receives, on a depository basis, materials from the United Nations, official publications of the State of Oregon, and materials from many industrial and business organizations and institutions.

Books may be taken for home use by anyone connected with Oregon State and by others with permission. Bound and unbound journals do not circulate. Students may keep books for two weeks, with privilege of renewal. Faculty members may borrow for more extended periods with exclusive borrowing rights for the initial two-week period.

All books, numbering over 2,500,000 volumes, in the libraries of the several state institutions of higher education are available, through unified administration, to the students and faculty of Oregon State. In addition, chiefly through the facilities of the Pacific Northwest Bibliographic Center, books are borrowed from and lent to other libraries in the Pacific Northwest and throughout the nation and world.

Unified Facilities. Library facilities of the state institutions of higher education in Oregon are coordinated through the Library Council of the Oregon State System of Higher Education.

The collections at the several institutions are developed to meet special needs on each campus; but the book stock of the libraries, as property of the State, circulates freely to permit the fullest use of all books. Faculty members and students from the various institutions of the Oregon State System of Higher Education may borrow directly from libraries on other campuses on presentation of an identification card.

Museums and Collections

Special exhibits and loan collections are displayed frequently in the Memorial Union, Fairbanks Hall, Kerr Library, Home Economics Building, and Horner Museum. Permanent museums and collections include:

The Horner Museum (THYRZA I. ANDERSON, curator) contains historical exhibits such as a turn of the century kitchen and a tool shed. Collections include: quilts, dolls and toys, pioneer items, Indian artifacts, guns, carriages, and an extensive display of minerals and fossils. Major shows and private collector exhibits occur each term. They include portraits, textiles, historic architecture, and chairs. Featured monthly are Sunday concerts, Children's theater, workshops, and foreign cuisine. The hours are: Weekdays 10-5, Saturday 10-2, Sunday 2-5, Monday closed.

The William Henry Price Memorial Collection of Paintings includes 53 paintings, chiefly western landscapes and marines, by the late William Henry Price. All but two of these distinctive paintings are on permanent display within the Memorial Union.

The Entomological Collection (PAUL O. RITCHER, curator) contains approximately 800,000 specimens of insects (including 6,000 microscope slides), chiefly from the Pacific Northwest. The collection is particularly strong in Hymenoptera, Coleoptera, Heteroptera, Homoptera, and Diptera. Five hundred Riker mounts of economically important insects are included in the collection. A special collection of Acarina, or mites, under the direction of G. W. Krantz, contains approximately 8,000 slides and 1,000 vials of specimens. All collections are housed in Cordley Hall.

The Geological Collection, housed in the Earth Sciences Building, includes minerals, ores, rocks, invertebrate fossils, vertebrate fossils, and fossil plants. More than 2,400 mineral specimens are arranged according to the Dana classification. This collection is now broken up for use in classes. A paleontological collection supplements the other collections.

The Silurian-Devonian Brachiopod Collection (A. J. Boucot, in charge) consists of about one million specimens located on the ground floor of the Earth Science Building. This is the most comprehensive collection of this type in the World with representation in some depth from every region of the World except China. The collection is available for use by both specialists and graduate students.

The Herbarium (KENTON CHAMBERS, curator) housed on the fourth floor of Cordley Hall, contains about 170,000 named specimens of seed plants, ferns, mosses, and fungi. Among the special items contributing to the usefulness of the herbarium are a seed collection of 2,800 numbers, and 250 photographs of type specimens of Northwest vascular plants. Part of the Herbarium, a collection of 750 sheets of marine algae, is housed at the Marine Science Center in Newport. The Mycological Collections (W. C. DENISON, curator) consist of approximately 40,000 dried specimens of fungi and lichens, supplemented by microscope slides and a culture collection. Included in the Mycological Collections are the H. C. Gilbert Myxomycete Collection and the Forest Service Pathology Herbarium.

The Ichthyological Collection (Carl E. Bond in charge) is located on the ground floor of Nash Hall. About 100,000 specimens, chiefly from North America, but representing all continents, are held. Emphasis has been given fishes of the Northwest, with most specimens from the fresh waters of Oregon.

The Natural History Collection (Robert M. Storm, in charge) includes nearly 25,000 specimens of terrestrial vertebrates, 27,500 bird eggs, and 550 mounts of birds and mammals. Housed on the first and fifth floors of Cordley Hall II, the collection includes the Braly Ornithological Collection, the Currier Bird Egg and Nest Collection, the Overton Dowell, Jr. Bird Collection and field notes, the Alex Walker Ornithological Collection and Library, and the Grace McCormac French ornithological notes and literature.

Publications

Official Publications of Oregon State University, published through the Office of Publications and printed by the Department of Printing include:

OREGON STATE UNIVERSITY BULLETIN (Catalog Issue, Summer Term Catalog, Graduate School Catalog, General Information).

BULLETINS, TECHNICAL BULLETINS, CIRCULARS, and *Oregon's Agricultural Progress* (quarterly) for the Agricultural Experiment Station.

BULLETINS, CIRCULARS, AND FACT SHEETS for the Extension Service, including farm building plans, range plant identification series, fertilizer recommendation series, home economics series, regional cooperative publications, and 4-H publications.

Publications of the School of Forestry.

Oregon Stater (alumni periodical).

Miscellaneous programs, announcements, folders, posters, career guides, and pamphlets.

The **Oregon State University Press** is the publishing and sales agency for the following:

MONOGRAPHS, including series in botany, economics, education and guidance, entomology, geology, history, literature and languages, political science, and zoology.

BIOLOGY COLLOQUIUM PROCEEDINGS (annually)

IMPROVING COLLEGE AND UNIVERSITY TEACHING (quarterly)

PROCEEDINGS OF THE PACIFIC NORTHWEST CONFERENCE ON HIGHER EDUCATION (annually)

YEARBOOK OF THE ASSOCIATION OF PACIFIC COAST GEOGRAPHERS (annually)

GENETICS LECTURES (annually)

Miscellaneous books and other publications as approved by the Board of Governors of the Oregon State University Press.

Student Motor Vehicle Regulations

Space limitations in the university community make the problem of student-operated vehicles one of grave concern to the administration, the faculty, and the students.

A student who brings a car to the campus must be willing to assume the following obligations:

a. That he furnish proper information on any vehicle in his possession or control for use on the Oregon State University campus at any time during the school year. The student is required to furnish the vehicle information in the Coliseum during registration for courses each term, or at the Traffic Committee Office in the lower level of the Administrative Services Building, at other times.

b. That he abide by the driving and parking regulations established for the OSU Campus. This includes purchase of an appropriate permit. Parking is restricted to certain designated areas and vehicles must display permits to authorize campus parking.

c. That he familiarize himself with all regulations which are published in "Your Car on Campus." This pamphlet may be obtained during registration in the Coliseum, at the Traffic Committee Office in the lower level of the Administrative Services Building, or from the Visitor's Information Booths at the 30th Street and Campus Way and the Jefferson Street entrances to campus.

d. That he keep his vehicle in mechanically safe driving condition, and that he obey the legal stipulations in the State Motor Vehicle Code.

Failure to accept these obligations as personally binding may cause the student driver to lose his motor vehicle privileges or receive more stringent penalties.

Procedures and Requirements

Admissions Information

OREGON STATE UNIVERSITY WELCOMES all students of good moral character without regard to race, creed, color, sex, or national origin who provide evidence of suitable preparation for work at the university level.

Admission to Freshman Standing

Early confirmation. A high school senior may apply for fall term admission at any time following completion of the first half of his final year.

A. ***Oregon residents being admitted as freshmen must:***
   1. Have been graduated from a standard or accredited high school *and*
   2. Meet *one* of the following:
      a. Have a 2.25 grade-point average or above in all high school subjects taken towards graduation *from the first through seventh semester* to enter fall term, or a 2.00 average to enter winter or spring terms, *or*
      b. Have a minimum combined score of 890 on the Scholastic Aptitude Test (SAT), or 20 on the American College Test (ACT) to enter fall term, or 880 SAT or 20 ACT to enter winter or spring terms*, *or*
      c. Have a minimum grade-point average of 2.00 in 12 term hours of college-level course work taken in an accredited collegiate institution, or in 9 term hours in a prescribed program in a regular collegiate summer term.

B. ***Nonresidents being admitted as freshmen must:***
   1. Have been graduated from an accredited high school and
   2. Meet one of the following:
      a. Have a 2.75 grade-point average in all high school subjects taken towards graduation *from the first through seventh semester* to enter any term, *or*
      b. Have a minimum 2.25 grade-point average combined with a satisfactory combined score on the SAT or ACT, *or*
      c. Have a 2.25 grade-point average in 12 term hours of college-level course work taken in an accredited collegiate institution or in 9 term hours in a prescribed program in a regular collegiate summer term.

C. ***Entering freshmen with superior records:*** Entering freshmen who demonstrate unusual competence in scholastic pursuits are provided special academic opportunities.
   1. *Advanced Placement Program:* Advanced placement or credit may be granted to entering freshmen who have completed college-level work and who have satisfactorily completed the College Board Advanced Placement Examinations during their senior year. See also 3. *Credit by Examination.*
   2. *University Honors Program:* On the basis of high school records and College Board test scores, entering freshmen may be invited to enroll in special Honors Sections designed to challenge the greater capacities of the superior student. Seminars, research projects, honors papers, independent study, and special courses are offered. Continued participation depends on evidence of sustained intellectual achievement. Qualified students may enter the program until the beginning of the junior year.
   3. *Credit by Examination.* Students with special competence in specific areas may apply on campus for a Departmental Examination which may qualify them for advanced placement or credit in that department. As an alternative to Departmental Examinations, students may seek credit through the College-Level Examination Program (CLEP) of the College Entrance Examination Board. CLEP includes nationally normed subject matter examinations, and general examinations covering material included in a number of relatively standard courses taught in colleges and universities throughout the United States. Some of these subject matter examinations have been accepted by departments of this institution. Policy guidelines have been established which make it possible for admitted and enrolled students to: (1) transfer credits through these accepted CLEP subject matter (but not general) examinations to this institution, providing certain criteria are met; and (2) earn credits through accepted CLEP subject matter (but not general) examinations, providing certain criteria are met. Further information about CLEP can be obtained from the University Counseling Center, Administrative Services 322.

Admission of Transfer Students (All undergraduates)

Undergraduate transfers from other colleges are required to present (1) evidence of eligibility to return to the last college or university attended and (2) a satisfactory grade-point average. Residents may transfer with a 2.00 (C) or higher grade average while nonresidents must present a minimum of 2.25. A student transferring fewer than 12 term hours must satisfy the entrance requirements for both transfers and entering freshmen. Transfers should review ADMISSION PROCEDURE, and PLACEMENT EXAMINATIONS. Foreign students entering as undergraduates should review the section on ADMISSION OF FOREIGN STUDENTS.

Oregon State University accepts in transfer college-level courses successfully completed in fully-accredited colleges and universities.

Upon arrival on campus, each transfer is assigned an adviser with whom the academic program is planned. Reports showing credit and class standing received from Admissions will often differ from departmental evaluation. Admissions determines college entrance eligibility only, while departments determine specific departmental degree requirements.

Transfer students are required to file complete official records of all college academic work attempted, certified by the Registrar of each institution where the work was undertaken.

Acceptance of credit from a two-year institution (OSU Academic Regulation 2)

a. Oregon State University accepts for credit toward a baccalaureate degree all college transfer work completed in an Oregon or other accredited community college up to 108 lower division term hours. A student who has completed 108 lower division term hours must obtain approval of a petition in advance before completing additional lower division work at a two-year institution if credit for such additional work is to count toward graduation. For all work accepted in transfer, hours attempted and points earned are used in calculat-

* The required testing program is for placement rather than entrance purposes, and is discussed under PLACEMENT EXAMINATIONS, page 13. Information concerning scheduled examination dates and examination centers may be obtained from the College Entrance Examination Board, Box 1025, Berkeley, California, or P.O. Box 592, Princeton, New Jersey, and the American College Testing Program, P.O. Box 168, Iowa City, Iowa. Official scores are forwarded to Oregon State by Educational Testing Service upon student request.

ing cumulative grade-point average.*

b. Block transfer of vocational-technical credit from accredited or nonaccredited community colleges into specific departmental programs at Oregon State University may be awarded up to 45 hours on the basis of proficiencies or experience as determined by the appropriate department, but without assignment of grade. Such credits will apply to the agreed-upon transfer program only, and the credit will not be awarded until completion of the program by the student. The 45 hours, or portion thereof, transferred will count as part of the 108 hours defined in paragraph 2a above.

c. Lower division credit for specific vocational-technical community college courses may be awarded for equivalent OSU course work when the equivalency is validated by the OSU department accepting and the OSU department offering the equivalent work. Designation of equivalent credit will follow the academic school's recommendation and approval by the University Curriculum Committee. These course credits will count as part of the 108 hours defined in paragraph 2a above. The initiating department shall review the equivalency annually and forward a report of this review to the Academic Requirements Committee. In the event the student transfers into another OSU department, that department will re-evaluate the equivalency of such vocational-technical courses.

Admission to Professional Programs and Schools

To protect students and professional standards, the admission and retention requirements and standards for evaluation and acceptance of transfer credit are often in addition to general admission and transfer requirements. Admission to Oregon State University does not, therefore, automatically admit students to its professional programs and schools. Because professional education is accredited and approved by societies established by the professions, students admitted to these schools must be prepared to undertake the curriculum at whatever level they enter it and to maintain school standards.

Admission as an Undecided Student

A student who is undecided about his or her academic major or future goals will find that OSU has a large variety of special programs allowing the undecided student to take a general course of study. Most of the OSU colleges and schools offer this service to the new student, as in Liberal Studies, General Science, General Agriculture, General Engineering, and General Home Economics. OSU also offers the University Exploratory Program (UESP) to allow undecided students to explore different courses and to help them, through special counseling, to find a suitable major field of study. Additional information may be obtained from the office of New Student Programs or the departments listed above.

Admission with Graduate Standing

To be considered for admission to the Graduate School, an applicant must have a baccalaureate degree from an accredited college or university, and a scholastic record and background and other evidence that indicate he is capable of doing satisfactory graduate work. See GRADUATE SCHOOL for further information; also ADMISSION PROCEDURE.

Admission of Foreign Students

A foreign student is admitted according to standards established for each country by the Admissions Committee. Basically such a student must (1) be qualified to enter his own university or Graduate School, (2) must have achieved a superior scholastic record on the basis of his own grading system, and (3) must have certified English proficiency as indicated by an appropriate score on the Test of English as a Foreign Language (TOEFL). A student with less than a four-year bachelor's degree, or with a diploma, certificate, or title not accepted as equivalent to a bachelor's degree, may apply for undergraduate admission but may not enter Graduate School.

All records in a foreign language must include the originals accompanied by a certified English translation. A complete description of all schooling from primary or elementary school to present level of training is needed to permit better understanding of academic preparation. A GPA of 2.50 is necessary to transfer from an American college or university.

Admission to Summer Term

The only requirement for admission to the Summer Term is ability to do the work. Those persons who expect to attend regular sessions or who desire to receive credit toward a degree at Oregon State must satisfy regular admission requirements.

Admission as a Special Student

Undergraduate Students. The special student category is designed to facilitate the enrollment of a person who at the time of application is not planning to complete degree requirements at OSU or who, for reasons which are judged to be acceptable by the Sub-Committee for Undergraduate Admissions of the Academic Reviews and Appeals Committee, does not meet regular admission requirements.

The Admissions Committee may consider for entrance as a special student:

1. A person qualified for regular admission but not planning to earn a degree at Oregon State.
2. A person who is not qualified for regular admission, is at least four years beyond the date that his or her high school class has graduated, and is not planning to earn a degree at Oregon State.
3. A high school junior or senior with a grade-point average of at least 3.00 who is recommended by his or her principal for enrollment in a specific course or courses.
4. A nonresident ethnic minority applicant who does not meet regular admission requirements but desires to enter some specialized OSU academic program not available in the applicant's state.
5. An otherwise qualified applicant who has been unable to obtain complete and/or official credentials required to document admission as a regular student and for whom admission approval is provided by the Undergraduate Admissions Sub-Committee.

A special student is not a degree student and recorded credit will be applied to a degree only if the student qualifies according to Academic Regulation 1 *Schedule of Classes* as a regular student and satisfies regular admissions procedures and regulations.

Graduate Students. The special student category may be utilized by those who possess a baccalaureate degree. This may include those holders of a baccalaureate degree who do not wish to pursue an advanced degree or those who have not met the requirements for admission to the Graduate School. A special student may be considered for status as a regular graduate student at any time, except that those who have previously been denied status as a regular graduate student must complete 24 hours of graduate work with a grade-point average of 3.00 or better prior to being reconsidered by the University Graduate Admissions Committee.

Graduate credit earned by a special student may be used to fulfill the requirements for an advanced degree only if (1) the work was not taken to qualify the student for graduate admission and (2) the work meets with the approval of the student's graduate committee."

Admission from Unaccredited Institutions

Admission from an unaccredited institution is determined by the appropriate Admissions Committee. Students admitted from

* Students who transferred credits from a two-year institution prior to winter term 1972 (under the earlier provisions limiting such transfers to credits completed during the first 93 term hours), are eligible to petition for transfer of those additional credits which would have been acceptable if the present provisions had been in effect at the time of transfer.

nonaccredited colleges are on probation until they have achieved a satisfactory record at Oregon State. After three terms of work at Oregon State University satisfactory to the Academic Requirements Subcommittee, a student may request validation of work done in an unaccredited institution of collegiate rank. The committee will consider each petition separately and base its decision on all information available. In some instances, informal examinations by the departments concerned may be required.

Credit for Military Experience

Veterans are granted physical education and/or ROTC credit but do not receive college credit for service schooling or USAFI tests or courses. Application should be made to the Registrar during first term attendance at Oregon State University.

Admission Procedure

Questions regarding admission and applications for admission, accompanied by the $10 nonrefundable application fee (payable to Oregon State University) should be addressed to: Office of Admissions, Administrative Services Building, Oregon State University, Corvallis, Oregon 97331.

Application Blanks, Form A, are available from the Office of Admissions. The special Oregon high school application form is available at all Oregon high schools at the close of the first semester of the senior year. The applicant requests the high school principal and/or the Registrar of each college attended to forward certified transcripts of all academic records directly to the Office of Admissions for evaluation purposes. All records submitted become the property of Oregon State. Transcripts for transfer students must include all schoolwork beyond high school and, for graduate students, must include all undergraduate and graduate records.

Applications should be received no later than thirty days before the opening of classes for the term of entrance. If currently attending a college elsewhere, a transfer applicant should apply during his final term or semester.

Placement Examinations

High school seniors planning to enter Oregon State should take the Scholastic Aptitude Test (SAT) of the College Entrance Examination Board or the American College Testing Program (ACT). See footnote page 11.

This test, together with the high school and other records, provides the academic adviser with valuable information about the student's educational development, abilities, and aptitudes.

The SAT or ACT should be completed prior to arrival on campus. Students who find it necessary to complete the test during the special campus administration may face delays in counseling and registration.

Transfer students who have not previously completed a college-level mathematics course must present scores of the College Entrance Examination Board Scholastic Aptitude Test or American College Testing Program before registration in an Oregon State University mathematics course.

Other placement examinations may be required in certain majors. Engineering students whose placement test scores indicate a deficiency in mathematics will be classified as "preengineering" and registered in mathematics courses compatible with the test results. Forestry students may receive similar special consideration.

Students who enter Oregon State University with previous language training in another institution and wish to continue their study of the language are required to take a language proficiency examination to determine placement level.

New Student Programs

Undergraduate students who enroll for the first time fall term are required to participate in a program of orientation and advising before officially registering. For the school year 1974-75, OSU will hold seven sessions of orientation and advising to assist new students in preparing for entry into college. Six of these programs, for *first term* freshmen only, will be held during July. The seventh will be held September 23-26. Transfer students will meet with their academic advisers at 1 p.m. on September 23. Freshmen will begin their program on September 24 for those who did not participate in the summer program. Summer registrants need not return to the campus until Monday, September 30. Detailed information is sent to those accepted for admission well in advance of the term of entrance.

Registration Procedures

Once admitted to Oregon State University, the information and procedures for registration become increasingly important. Registration periods, with published dates, are set aside each term. Complete registration instructions, procedures, and deadlines for which every student is fully responsible are detailed in the annual *Schedule of Classes* publication available on campus shortly before the opening of fall term. A student is officially registered and eligible to attend classes only when all procedures have been completed, including payment of tuition and fees.

In addition to the basic information regarding registration, the *Schedule of Classes* is an essential source document to the student for the Academic Calendar, Fee Schedule, Academic Regulations and Procedures, and Final Week Schedule, as well as the listing of courses offered during the academic year.

Regular OSU students (those admitted, enrolled, and attending fall, winter, or spring terms), must apply for re-admission after being absent from the campus for one or more terms (not including summer term) or after officially withdrawing from school during a term. Applications for re-admission must be received in the Registrar's Office at least two weeks before registration begins for the term in question. If the applicant has completed 12 or more term hours at another institution since leaving OSU, his (her) eligibility for re-admission is based on the same requirements as for original admission of a transfer student, either resident or nonresident.

Prior to admission or re-admission to OSU, students must file in the Registrar's Office official transcripts of all academic work attempted prior to attending or since leaving OSU. Failure to do so will involve questions of academic honesty and possible penalties.

Concurrent Enrollment

OSU students paying full tuition may enroll for courses through other units of the Oregon State System of Higher Education at no additional cost in a concurrent enrollment program. Complete details of policies and procedures are available in the Registrar's Office.

Degrees and Certificates

Oregon State University offers curricula leading to the following baccalaureate and graduate degrees:

Liberal Arts, *B.A., B.F.A., B.S.*
Science, *B.A., B.S., M.A., M.S., Ph.D.*
Agriculture, *B.S., B.Agr., M.Agr., M.S., Ph.D.*
Business and Technology, *B.A., B.S., M.B.A., M.S.*
Education, *B.A., B.S., M.A., M.S., Ed.M., Ed.D., Ph.D.*
Engineering, *B.A., B.S., M.A., M.S., A.E., Ch.E., C.E., E.E., I.E., M.E., Met.E., M.Mat.Sc., M.Oc.E., Ph.D.,*
Forestry, *B.S., B.F., M.S., M.F., Ph.D.*
Health and Physical Education, *B.A., B.S.*, advanced degrees through School of Education.
Home Economics, *B.A., B.S., M.A., M.S., M.H.Ec., Ph.D.*
Oceanography, *M.A., M.S., Ph.D.*
Pharmacy, *B.A., B.S., M.A., M.S., M.Pharm., Ph.D.*

Aerospace Studies, Military Science, or Naval Science may be taken as a comajor in any school.

Work leading to the degree of *Master of Arts (General Studies)* is offered under the direction of the Graduate School.

Lower division work leading to certificates (see next page) is offered in liberal arts and sciences, in the professional and technical fields listed above, and in architecture and allied arts, journalism, and music. Approved preparation is offered also for the degree curricula in medicine, dentistry, and nursing at University of Oregon Medical School and University of Oregon Dental School in Portland, as well as in law and in veterinary medicine.

Requirements

To earn the Bachelor of Arts degree (B.A.) or Bachelor of Science degree (B.S.), a student must complete three sets of requirements: (1) general institutional requirements, (2) institutional graduation requirements, and (3) requirements of the department and school. Curricular and departmental requirements are listed elsewhere in this Catalog. Institutional requirements follow:

General Requirements (Institutional)

A student is expected to fulfill the following requirements during his first six terms:

a. Physical education: three terms in activity courses. Students over 30 years of age are not required to take physical education activity courses. No more than one activity course may be taken at one time, (except for physical education majors), but it is permissible for personal health and an activity class to be taken concurrently. A total of 8 term hours of performance courses may be elected above the regular requirement.

b. Personal health: one term.

Graduation Requirements (Institutional)

a. Term hours: minimum, 192 (in Engineering [except Technology majors] and Forestry, 204; in Pharmacy [five-year curriculum], 240). The minimum must include:
   (1) Hours in upper division courses: minimum, 45, exclusive of upper division physical education activity courses.
   (2) Hours in major: minimum, 36, including at least 24 in upper division courses.
   (3) English Composition: 3 term hours* (satisfactory completion of Wr 121).

b. Distribution of hours for baccalaureate degrees:
   (1) Bachelor of Arts: 36 hours in humanities (except English Composition and Corrective Speech) including proficiency in a foreign language equivalent to that attained at the end of the "Second-Year" course in the language.
   (2) Bachelor of Science: 36 hours in science, or 36 hours in social science, or 45 hours in science and social science together.
   (3) Professional bachelor's degree (B.F, B.Agr.): fulfillment of all school requirements.

c. Grade-point average: minimum of 2.00 on all of the following:
   (1) All college work.
   (2) All work taken in residence at this institution (exclusive of Division of Continuing Education courses).
   (3) Last 45 hours for which registered.
   (4) In at least two of the last three terms.

d. Residence: Minimum, the last 45 term hours or 45 of the last 60 if authorized by approval of a petition to the Academic Requirements Subcommittee. Classroom work taken through the Division of Continuing Education is not considered as residence work.

e. Dean's certification of fulfillment of all requirements of major school. (For details see school advisers or deans.)

f. Restrictions:
   (1) Correspondence study: maximum, 60 term hours.
   (2) Law or medicine: maximum, 48 term hours.
   (3) Music (applied music): maximum, 12 term hours. (Restriction not applicable to majors in music.)

g. Application for degree: To become a candidate for a degree a student must have achieved senior standing† and must make formal application for the degree. The student must file his application with the Registrar during the first week of the term preceding the term in which he expects to complete requirements for a degree.

Concurrent Degrees

A student may receive two or more baccalaureate degrees (for example, B.A. or B.S. with same or different majors) at the same or subsequent graduation exercises provided that (1) he meets the requirements of the curricula represented by the degrees; (2) he completes for each additional degree a minimum of 32 term hours more than the 192 term hours or 204 term hours required by the first degree (the additional term hours may be taken concurrently with 192 or 204 term hours); (3) he is registered during the last three terms before his graduation at least one term in each appropriate school or department.

Requirements for Certificates

These certificates may be granted on completion of approved programs:

Junior Certificate, granted on application and completion of requirements for junior standing and with dean's approval.

Certificate in Agriculture, granted on application and completion of two-year curriculum and with approval of dean.

Certificate in Engineering, granted on application and completion of two-year curriculum and with approval of dean.

Requirements for Advanced Degrees

For advanced degree requirements see GRADUATE SCHOOL section of this catalog. Students who take courses they wish to apply toward an advanced degree before they have received baccalaureate degrees may have a limited number of credits by petition. See "Reserving Credits" under GRADUATE SCHOOL.

Definitions

Academic Year: three terms of approximately twelve weeks each.

Summer Term: a session extending from late June for eight or eleven weeks depending upon the program chosen.

Course: a subject, or an instructional subdivision of a subject, offered through a single term.

Sequence: closely articulated courses extending through more than one term.

Prerequisite: the background necessary for successful performance in a course. In addition to stated requirements, or acceptable substitute, consent of instructor is implied for admission to class.

Curriculum: an organized program of study arranged to provide integrated cultural or professional education.

Term Hour: the unit of credit, representing three hours of the student's time each week for one term. This time may be assigned to work in classroom or laboratory or to outside

* The university requirement in English Composition is under review; continuation of the term-hour requirement is subject to approval by the State Board of Higher Education. Questions may be referred to the Department of English.

† Before senior standing may be achieved, a student must complete 135 term hours with a grade-point average of 2.00. He must include three terms of physical education activity, and one term of personal health.

preparation. The number of meetings per week for any course may be found in the course description in this catalog or in the separately published *Schedule of Classes*. To convert semester hours to term hours, multiply by 1½ (e.g., 10 semester hours count as 15 term hours).

Period: a class meeting for discussion, lecture, laboratory, etc. The number of class meetings per week for each course in this catalog is indicated by use of symbols indicating length of periods. ① indicates a one-hour period, ② a two-hour period, ③ a three-hour period, etc. For example: 2 ① 1 ③ indicates *two one-hour periods and one three-hour period.*

Grade-Point Average: Total number of grade points received for A, B, C, D, or F grades divided by total term hours. (See POINTS, below.)

Course Numbering System

Throughout the State System of Higher Education, courses follow this basic course numbering system:

1- 10.	Noncredit remedial courses not offered in regular curriculum.
11- 49.	Noncredit courses or credit courses of a terminal or semi-professional nature not applicable toward degree requirements.
50- 99.	Credit courses applicable toward degree requirements but of a basic, preparatory, subfreshman level, such as the first year of a foreign language or fundamental mathematics courses.
100-299.	Courses on the lower division level.
300-499.	Courses on the upper division level. 400-499, with designation (G) or (g). Upper division courses which may be taken for graduate credit. Courses which may be taken for graduate *major* credit are designated (G); courses which may be taken for graduate *minor* credit only are designated (g).
500-599.	Graduate courses. Seniors of superior scholastic achievement may be admitted on approval of instructor and department head concerned.
600-699.	Professional courses which may be applied toward a professional degree but not toward an advanced academic degree.

Reserved Numbers.

100-110, 200-210.	Survey or foundation courses at the freshman and sophomore levels.
400-410, 500-510.	Reserved numbers. Certain of the numbers in these blocks have been assigned as repeating numbers to specific courses which may be taken for more than one term under the same number, credit being granted according to the amount of work done. Reserved numbers at Oregon State include the following:
401, 501.	Research.
403, 503.	Thesis.
405, 505.	Reading and Conference. (Individual reading reported orally to instructor.)
406, 506.	Projects.
407, 507.	Seminar.
408, 508.	Workshop.

Grading System

Grades

The grading system consists of five basic grades, *A, B, C, D,* and *F*. *A* denotes exceptional work accomplished; *B,* superior; *C,* average; *D,* inferior; *F,* failure. Other marks are *E,* final examination not taken; *I,* incomplete; *W,* withdrawal; *R,* thesis in progress; *P,* pass; *N,* no credit; *S,* satisfactory; *U,* unsatisfactory.

A student who has done acceptable work to the time of the final examination but does not take it will receive an *E*. The *E* may be removed upon presentation to a faculty committee of an acceptable reason for not taking the final examination. An *E* not removed within the first term after the student's return to the institution will be changed to an *F*.

For failure in a course, the grade of *F* is given. When the quality of the work is satisfactory and the scheduled final examination has been taken, but some minor essential requirement of the course has not been completed for reasons acceptable to the instructor, a report of *I* may be made and additional time granted.

Students may withdraw from a course by filing the proper forms at the Registrar's Office in accordance with OSU regulations; in such cases a report of *W* is made. A student who discontinues attendance in a course without official withdrawal receives a grade of *F* in the course.

Grade Points

Grade points are computed on the basis of 4 points for each term hour of *A* grade, 3 points for each term hour of *B*, 2 points for each term hour of *C*, 1 point for each term hour of *D*, and 0 points for each term hour of *F*. *Marks of E, I, W, P, N, R, S,* and *U* are disregarded in the computation of points. The grade-point average (GPA) is the quotient of total points divided by total term hours in which *A, B, C, D,* and *F* are received.

Scholarship Regulations

The Academic Deficiencies Subcommittee has discretionary authority to suspend or place on probation any student not achieving profitable and creditable progress toward graduation (minimum of 2.00 or "C" for both term and cumulative).

a. **Probation:** Any student achieving a grade average below 2.00 "C," either term or cumulative, will be placed or continued on probation (unless subject to suspension).

b. **Suspension:** Most suspensions occur when a student is 12 or more points deficient. (See grading system on previous page.) If other factors so indicate, (for example—three consecutive terms under 2.00 GPA) a student may be suspended with fewer than 12 points deficiency.

Also, a student 12 or more points deficient for his last two or more terms may be suspended, even though he may have a cumulative average above 2.00. (Hence, a student is not able to use previously earned surplus grade points to permit consistently unsatisfactory current work.)

c. **Release from Probation:** Any student on probation may achieve good standing by earning both term and cumulative 2.00.

d. Students who have been suspended or expelled are denied all the privileges of the institution and of all organizations in any way connected with it, and are not permitted to attend any social gatherings of students or to reside in any fraternity, sorority, or club house, or in any of the halls of residence.

Fees and Deposits

Fee and Tuition Schedule for 1974-75

Term Hours	Resident Undergrads	Non-Resident Undergrads	Graduate Students
Full-Time			
12-21	$188.00	$608.00	.....
9-16	.....	.....	$280.00
Part-Time			
1-2	54.00	123.00	82.00
3	66.00	170.00	109.00
4	78.00	187.00	135.00
5	90.00	264.00	160.00
6	102.00	311.00	189.00
7	115.00	360.00	219.00
8	129.00	409.00	249.00
9	143.00	459.00	.....
10	155.00	509.00	.....
11	173.00	558.00	.....
Overtime			
Each Additional Hour	12.00	47.00	26.00

Note: Fees and tuition shown above are subject to change. *Final fee amounts have not been established.*

Regular Tuition Fees

Students paying regular fees are entitled to all services maintained by Oregon State for the benefit of students. These services include: use of the Library; use of laboratory and course equipment and materials; medical attention and advice at the Student Health Center; use of gymnasium equipment, including gymnasium suits and laundry service; a subscription to the student

newspaper; admission to regular athletic events; and admission to concerts and lectures. No reduction in fees is made to students who may not desire to use these privileges. Staff, auditors, senior citizens, and special students do not receive these services.

Special Fees

Application Fee (not refundable) $10.00
Must accompany admission application.

Late-Registration Fee ..... first day $5.00
Students registering after scheduled registration dates of any term pay a late-registration fee of *$5 a day for the first day and $1 a day thereafter.* Also applies to part-time students and auditors.

Return-of-Check Fee $5.00
If institutional charges are met by a check which is returned because of any irregularity for which student is responsible, a fine will be charged in the amount of $5. The late registration fee will be added to the returned check charge where the returned check was used to pay tuition and fees.

Change-of-Program Fee .....per course, $1.00
The student pays this fee for each course change in his official program after the scheduled last day of mass registration.

Reinstatement Fee $2.00
If for any reason a student has his registration canceled during a term for failure to comply with the regulations of the institution, but is later allowed to continue his work, he must pay the reinstatement fee.

Special-Examination Fee ..... per examination, $15.00
Examination for credit.

Transcript Fee, first copy ..... $ 2.00
Added copies furnished simultaneously, $1.

Staff Fee (except staff auditors) ..... per term hour, $5.00
Staff members may register for courses at a $5-per-term-hour rate. Full-time staff members are limited to a maximum of 3 hours per term, except a *single* course carrying up to 5 hours is permitted. Any employee whose appointment is equivalent to .50 or more (but less than full-time) may take up to 10 hours a term at this rate. Payment of fees entitles member to instructional and library privileges only.

Senior Citizen Fee (not refundable) ..... per term hour, $5.00
Persons 65 or older may attend class on a noncredit-space available basis. Incidental fee privileges are not provided.

Annual Counseling Center Testing Fee $7.50

College Board Aptitude Fee $5.50

Graduate Qualifying Examination Fee..... $1.00 to $15.00

Microfilming Doctoral Thesis..... $20.00

Placement Fee (see EDUCATION) ..... first registration, no charge
Reregistration $5 per year.

Applied Music Fees (See MUSIC).....per term, $30.00 to $50.00

Horseback Riding Fee..... per term, $40.00

Nonresident Fee

Under the regulations of the Oregon State Board of Higher Education, a minor student whose parent or guardian is a bona fide resident of Oregon qualifies for enrollment under the resident fee. An emancipated student whose domicile is independent of his parent or guardian qualifies for enrollment under the resident fee if he presents convincing evidence that he established his domicile in Oregon six months prior to his first registration in any institution of higher learning in the State of Oregon.

All other students are required to pay the nonresident fee, with the following exceptions: (1) a student who holds a degree from an accredited college or university (however, a nonresident student with a bachelor's degree enrolled in a curriculum at the University of Oregon Medical or Dental School leading to the degree of Doctor of Medicine or Doctor of Dental Medicine is required to pay the nonresident fee); (2) a student attending a summer session.

Nonresident undergraduates registered for fewer than 12 credit hours or more than 21 credit hours shall pay for each such hour one-twelfth of the normal tuition charged to nonresident undergraduates, except that the minimum charge to a part-time nonresident undergraduate shall be two-twelfths of the normal tuition charge.

A student who has been classified as a nonresident *may be* considered for reclassification as a resident:

(1) In the case of a minor, if his parent or guardian has moved to Oregon and has established a bona fide residence in the state, or

(2) In the case of an emancipated student whose domicile is independent of that of his parent or guardian, if the student presents convincing evidence that he has established his domicile in Oregon and that he has resided in the state for an entire year immediately prior to the term for which reclassification is sought, and that he has no intention of moving out of the state after completion of his school work.

A student whose official record shows a domicile outside of Oregon is prima facie a nonresident and the burden is upon the student to prove that he is a resident of Oregon. If his scholastic record shows attendance at a school outside of Oregon, he may be required to furnish further proof of Oregon domicile.

If any applicant has questions concerning the rules governing the administration of these policies, he should consult the Office of Admissions.

Graduate Fees

Graduate students do not pay nonresident fees. Teaching or research assistants pay $45 per term. Graduate Assistants at .15 FTE and taking over 15 hours per term or those at .30 FTE and taking over 12 hours per term may be subject to an overtime fee of $26 per term hour. Consult the Graduate School Office for full details. Payment entitles the student to all services maintained for the benefit of students.

Concurrent Enrollment

Oregon State University students paying full tuition may enroll for courses through other units of the Oregon State System of Higher Education, at no additional cost, in a concurrent enrollment program initiated Fall Term, 1967. Complete details of policies and procedures are available in the Registrar's Office.

Deposits

Persons who enroll for academic credit (except staff members) must make a deposit of $25, payable once each year at the time of first registration. This is required as a protection against loss or damage of institutional property such as laboratory equipment, military uniforms, library books, locker keys, or residence hall equipment. If at any time charges against this deposit become excessive, the student may be called upon to reestablish the original amount.

The deposit, less any deductions, is refunded about one month after close of the academic year. Students who discontinue work before the end of the year may request refunds by petition to the Business Office.

Tuition Refunds

Students who withdraw from the University who have complied with regulations governing withdrawals are entitled to certain refunds of fees paid, depending on time of withdrawal. The refund schedule established by the State Board of Higher Education is as follows: Withdrawal before the beginning of classes, 100%; before the close of 1st week, 90%; before the close of 2nd week, 75%; before the close of the 4th week, 50%; before the close of the 6th week, 25%.

Students who reduce course loads from full-time to part-time status will be refunded for hours dropped below full-time based on the following schedule: Before the beginning of classes, 100%; before the close of the first week, 90%; before the close of the 2nd week, 75%.

Any claim for refund must be made in writing before the close of the term in which the claim originated. Refunds are calculated from date of application for refund and not from date when the student ceases attending classes, except in unusual cases when formal withdrawal has been delayed through causes largely beyond the control of the student.

Student Services

Dean of Students ..... Robert W. Chick, Ed.D.
Associate Dean of Students ..... Jo Anne J. Trow, Ph.D.
Associate Dean for Medical Services and
Director, Counseling Center .....Morris L. LeMay, Ed.D.
Associate Dean of Students for Student Activities and
Director, Memorial Union ..... George F. Stevens, M.Ed.
Assistant Deans of Students ..... William J. Brennan, M.Ed.
D. Kay Conrad, M.Ed.
Assistant to the Dean of Students and
Director of Special Programs ..... J. Roger Penn, Ph.D.
Assistant Director, Counseling
Center ..... Leslie G. Dunnington, Ph.D.
David T. Bice, Ph.D.
Counselors ..... Elaine J. Copeland, M.A.T.
Joan Harris, M.Ed.
F. Clifford Michel, M.Ed.
Kenneth Naffziger, Ph.D.
Sally Wong, M.S.W.
Director of Financial Aid ..... Richard E. Pahre, M.A.
Assistant Director ..... Jean D. Hogensen, M.S.
Director of Student Housing and Residence
Programs ..... M. Edward Bryan, M.Ed.
Assistant Director ..... S. Roger Frichette, M.A.
Assistant Director, Residence
Programs ..... Lydia A. White, M.Ed.
Publicity Coordinator ..... David T. Doherty, Ed.M.
Program Coordinator,
Contracting Officer ..... Robert A. Hartman, M.A.

Director of New Student Programs ..... J. Franz Haun, D.Ed.

Assistant Director, University Food
Service, Residence Halls ..... Kathleen Scoggin, B.S.
Assistant Director, University Food
Service, Memorial Union ..... Paul Scoggin, B.S.
Assistant Director, Residence Hall
Food Service ..... Phillip R. Parker, M.S.

Director of Educational Activities and
Physical Recreation ..... Donald Sanderson, Ed.D.
Assistant Director of Educational
Activities and Physical Recreation..Bernard J. Pitts, B.S.
Manager, Memorial Union
Building ..... Duane S. Fitzgerald, B.S.

Director of Student Publications and
Public Events ..... Irwin C. Harris, M.A.

Director of Student Health Service .. William P. Stephan, M.D.
Assistant to the Director .... F. Leonard Gibson, M.S., H.A.
Chief Clinical Psychologist .... Raymond S. Sanders, Ph.D.
Clinical Psychologist ..... J. Mark Wagener, Ph.D.
Psychiatric Social Worker Georgine E. Thompson, M.S.W.
Physicians ..... Clifford Anderson, M.D.
John Chu, M.D.
John S. Giffin, M.D.
Margaret Dowell Gravatt, M.D.
Maja Jovanovic, M.D.
William R. Marriott, M.D.
Charles E. Reger, M.D.

At Oregon State University a variety of student services, programs, and facilities including new student programs and orientation, financial aid assistance, housing, counseling and advising services, medical services, Memorial Union programs, educational activities, and physical recreation are provided to help students to derive greater benefits from their total university experience. The Dean of Students, Room A220 Administrative Services Building, is responsible for the coordination of these student services.

Office of Student Services

The Office of Student Services, AdS A218, provides personalized assistance to individual students, organizations, parents, faculty, and other members of the university community. Students who have questions about university policy or personal problems, or who need help in cutting red tape will find assistance in this office. Staff members have responsibility for living group advising, student assistance programs, student records maintenance, withdrawal advising, related instructional programs, and the student conduct program.

New Student Programs

The Office of New Student Programs, located in AdS A218, coordinates orientation activities for prospective undergraduates from the time they first have contact with the University through their first year at Oregon State. Programs coordinated by the office include: Beaver Open House, the Summer Orientation and Advising programs, and Moms and Dads Club programs.

Financial Aid

Philosophy. Oregon State University's financial aid program provides assistance and advice to students who would be unable to pursue their education at the University without such help. Scholarships, grants, loans, and part-time employment are available singly or in various combinations to meet the difference between what the student and his family could reasonably be expected to provide and the expected cost of attending OSU.

Need Analysis. To qualify for financial aid, each student must demonstrate financial need. Oregon State University uses College Scholarship Service, a national nonprofit need analysis organization, to assist the University staff in determining financial need. This service uses a fair and uniform analysis system based upon family income, assets, and other resources of the student. In applying for financial aid, a student is required to submit the Parents' Confidential Statement to College Scholarship Service or the married/independent budget form, if appropriate, to the Financial Aid Office. The financial aid staff determines the student's need upon receiving the completed application and the financial data from College Scholarship Service.

Application Procedures. Returning OSU students, transfer students, and nonresident freshmen may request application forms from the Financial Aids Office, Administrative Services Building, Oregon State University, Corvallis, Oregon 97331. Entering Oregon freshmen should obtain application forms from their high schools.

With the exception of the guaranteed student loan program students may apply for scholarships, loans, grants, and College Work-study on a single application form. For these programs, dependent student applications are expected to furnish a 'Parent's Confidential Statement' to the College Scholarship Service, P.O. Box 1501, Berkeley, California 94701. The deadline for scholarship applicants to submit this statement is January 15. The completed application form should be submitted to the OSU Financial Aid Office by March 1 for all forms of aid except the Guaranteed Student Loan and Basic Educational Opportunity Grant applications. Applications received after March 1 will be considered after other applications have been proc-

essed. Guaranteed Student Loans will be considered after July 1.

Student Loans

A student must maintain good standing in order to qualify for a loan at OSU. Funds are usually advanced in equal amounts at the beginning of each term of the academic year.

National Direct Student Loans. Loans are available to students who qualify on the basis of financial need analysis. Undergraduates may borrow up to $2,500 for the first two years, $5,000 for four years, and graduate students an aggregate of $10,000. Repayment is arranged on a quarterly basis following the termination of full-time studies. Interest is charged during the repayment period at 3 percent simple interest. Undergraduate pharmacy students must apply for the Health Professions Student Loan in lieu of the National Direct Student Loan.

Guaranteed Student Loans. Loans are available to OSU students through cooperation of the University, the student's home state loan guaranty agency, and the student's hometown bank. Oregon residents should contact the OSU Financial Aid Office for further information; nonresidents should contact their home state guaranty agency or hometown lending agency. Oregon undergraduates and graduates may borrow up to $1,500 per class year. Resident and nonresident amounts are determined by each state agency or bank. Interest at 7 percent per year may be subsidized by the federal government while the student is in school if it is determined the student has a need. Dependent students are required to file a Parents' Confidential Statement. Repayment is on a monthly basis starting 10 months after the student leaves college.

Regular Student Loans. Loans based upon financial need analysis are available to students in good standing at the University who have completed at least one term at OSU. The borrowing maximum is $700. Interest is charged at 4 percent annually on any unpaid balance. Repayment can be made at any time but must begin 9 months after a student leaves college, or if enrolled less than full-time. A Contract of Guaranty (co-signer) is required for all students. OSU students, spouse, staff, and faculty are not eligible to act as co-signers.

Emergency Loans. The Financial Aid Office maintains a short-term emergency loan fund for continuing full-time students and those who have been admitted for the ensuing fall term.

Other Loans. Administered by the trustees of the Student Loan Fund: Harding McKinney Fund for juniors and seniors in electrical engineering; Oregon Feed, Seed, and Suppliers Association for juniors and seniors in agriculture; James and Delmer Shaver Loan Fund for senior men and women; Oregon State Pharmaceutical Association Educational Fund; Marion Horton Loan Fund; W. C. Williams Loan Fund for seniors in engineering; Oregon State Horticultural Society Fund for studying varied phases of horticulture; Oregon Home Economics in Homemaking Loan Fund for home economics students; E. N. Sidor Memorial Loan Fund for students in engineering; Benton County TB and Health Loan Fund for students in health education and prenursing; Health Professions Student Loan Program for junior, senior I, senior II students in pharmacy; the OSU Book Stores, Inc. Loan Fund; Jerry R. Alexander Loan Fund for Navy ROTC students; Lt. Lawrence Gallego Loan Fund for Army ROTC; Emma Crawford Loan Fund; Frank Richards Loan Fund for junior and senior students in agriculture; Orville Corbett Loan Fund for pharmacy students; Martin Johnson Loan Fund; James M. Berry Loan Fund for students in preveterinary medicine; Patricia Carter Memorial Loan Fund; Charles Rikhoff, Jr., Student Loan Fund; Lewis and Olga Tuthill Student Loan Fund; Oregon State Pharmaceutical Association Women's Auxiliary Loan Fund for students in pharmacy; Wayne Valley Memorial Fund for Varsity Lettermen; and the Ralph I. Thompson Scholarship Loan Fund for students in engineering.

Grants

Supplemental Educational Opportunity Grant. The Supplemental Educational Opportunity Grant program provides cash awards to students with exceptional financial need. The student must be a citizen of the United States or have an immigrant visa. Grants range from $200 to $1,500 per academic year with four year aggregate not to exceed $4,000. The grant must be matched by other types of financial aid received through the University, including scholarships, loans, and part-time employment. A student applying for a Supplemental Educational Opportunity Grant should usually apply for other assistance from OSU to meet the matching requirement.

Basic Educational Opportunity Grant. The Higher Educational Amendments of 1972 established the Basic Educational Opportunity Grant (BEOG) which is intended to be the "floor" of the student's financial aid award. For the 1974-75 academic year, eligibility will be restricted to freshmen and sophomores. Students submit a BECG application which may be obtained from a high school counselor or the Financial Aid Office. A Family Contribution Analysis Report will be returned to the student within four weeks. This report must be presented to the Financial Aid Office for final determination of the award amount. A new application must be submitted each year, beginning in the spring of 1974 for the 1974-75 academic year.

State Need Grant for Oregon Residents. High school seniors needing financial aid are eligible to apply for the Need Grant awarded by the State Scholarship Commission. Applicants must meet admissions standards of the institution and have financial need. Awards are made up to a maximum of $500 and are renewable until graduation provided satisfactory academic progress and financial need are continued. High school seniors apply through their high school principals.

Law Enforcement Education Program. Full-time employees of law enforcement agencies may apply for grants to cover the cost of tuition, books, and mandatory fees not to exceed $250 per term. Eligible students may attend part-time or full-time. However, courses taken must be creditable toward a degree or certificate, not necessarily in law enforcement. A special application form is required and is available in the Financial Aid Office.

Employment

Work-study. The College Work-study program provides federally supported part-time employment for students qualified through financial need analysis. Full-time summer employment with non-profit agencies which have Work-study contracts with Oregon State University may be available to students living in the Corvallis area and in many communities throughout the state. Students must be admitted to the university to qualify for this program.

Part-time Employment. The Financial Aid Office assists students in securing part-time jobs while enrolled in college and also assists them in obtaining vacation jobs. However, the demand for part-time employment exceeds the number of jobs available.

Students may request additional information about financial aid opportunities from the Financial Aid Office, Administrative Services Building, Oregon State University, Corvallis, Oregon 97331.

Scholarships

The scholarships program is coordinated through the University Committee on Scholarships. Most scholarships require evidence of ability, promise, and reasonable need for help in meeting minimum college expenses. Students who apply to the committee will be considered for all scholarships for which they qualify.

Application blanks are available from the Oregon State University Financial Aid Office, Administrative Services Building, Room A222, or from any Oregon high school principal. Applications, including transcripts of all academic work to date of application, for all students except entering Oregon freshmen, should be forwarded to the Financial Aid Office by March 1 of each year. Oregon freshmen should submit application and transcript to their high school principal for transmittal to the Oregon State Scholarship Commission. Exceptions to these procedures will be noted for certain of the scholarships administered by other agencies.

State Cash Scholarships for Oregon Residents

High school seniors with an outstanding academic record who need financial aid are eligible to apply for cash scholarships awarded by the State Scholarship Commission. These awards have an annual possible maximum value of $500 and are renewable until graduation, provided satisfactory academic progress and financial need are continued. High school seniors apply through their high school principals. Students must apply through the OSU Financial Aid office for renewal awards.

State Scholarships for Returning Students

Returning students who have received state scholarships in the 1971-72 and/or 1972-73 academic year are eligible to apply for renewal of the award. These scholarships include the State Tuition and Partial Fee Remission Scholarships, District and County Scholarships, and State Scholarships for Nonresident Students.

State Scholarships for Returning Foreign Students

Scholarships for a limited number of undergraduate and graduate students attending OSU from foreign countries are made available through the State Scholarship Commission. To be considered for this award a student must have a financial need and an accumulative grade-point average of 2.50.

Graduate Students

Graduate students (except foreign students) are not eligible to apply for scholarships through the Financial Aid Office. Information regarding fellowships, grants, assistantships, etc., is available in the Graduate School or each individual department.

All-Campus

AGSTEN SCHOLORSHIP: $300 to a freshman, based on university scholastic requirements and financial need, honoring Clarence W. Agsten.

AIR FORCE ROTC SCHOLARSHIPS: (see AEROSPACE STUDIES).

ALBRIGHT MEMORIAL SCHOLARSHIP: A four-year scholarship covering tuition and books honoring Mable Norman Albright. Applicant must be a graduating senior from a Benton County high school. Selection based on scholastic standing, high school and community activities, good citizenship, and financial need.

ANDREWS SCHOLARSHIP: Full tuition through an endowment left by Naomie Catherine Andrews. Selection based on financial need and seriousness of purpose.

ARIZONA SAWYERS SCHOLARSHIP: $500 to an Oregon woman student intending to pursue a teaching career.

ARMY ROTC SCHOLARSHIPS: (see MILITARY SCIENCE).

BABB SCHOLARSHIP: $500 to an outstanding freshman athlete, in memory of Bert Babb, Sr.

BAIRD SCHOLARSHIP: $500 to an outstanding varsity basketball player, in memory of Dr. Earl E. Baird.

BANK OF ST. HELENS SCHOLARSHIP: Tuition for an outstanding entering freshman athlete from Columbia County.

BARTLETT SCHOLARSHIP: $500 to an entering freshman of exceptional character and scholarship who has been active in football in high school, honoring Dr. C. L. Bartlett.

BERGER SCHOLARSHIPS: Scholarships ranging from $300 to $800. Available to both resident and nonresident undergraduates. Selections based on high scholarship, financial need, and character, with promise of rendering service to the University. A memorial to Marie Harbeck Berger.

BLITZ-WEINHARDT FOUNDATION SCHOLARSHIP: $500 to a junior varsity football or basketball player, for his senior year.

BOSWORTH SCHOLARSHIP: $500 to a premedical student who has been admitted to medical school and who has financial need, a memorial to Ralph L. Bosworth.

COLLINS SCHOLARSHIPS: Scholarships provided as a memorial to James Harrison Collins for graduates of Columbia County high schools. Each awardee must be in top 15% of his graduating class, be of excellent character, have an outstanding record of service to school and community.

DALY SCHOLARSHIPS: A limited number of scholarships awarded annually to worthy young men and women of Lake County by the Bernard Daly Educational Fund, established through the will of the late Dr. Bernard Daly of Lakeview, Oregon. Selections are made on the basis of a qualifying examination held in Lake County.

DAVIS SCHOLARSHIPS: $300 each to six resident members of the OSU chapter of Acacia Fraternity, and $300 each to six entering freshman men or women who are National Merit Semi-Finalists, provided by the Walter Edwin Davis and Edith McKay Davis Fund.

DELTA DELTA DELTA SCHOLARSHIP: One or more scholarships given by Delta Delta Delta, national sorority, to worthy undergraduate women.

DOUGLAS COUNTY HOME EXTENSION SCHOLARSHIP: $300 scholarship awarded to a worthy man or woman graduating from a Douglas County high school and planning to attend Oregon State University. Application through high school principal with approval of local unit extension officers.

EVANS PRODUCTS SCHOLARSHIP: $500 to a deserving athlete attending OSU.

FISHER FORD SCHOLARSHIP: In-state tuition to an entering freshman athlete from the Portland market area, provided by Joe Fisher Freeway Ford.

GENERAL ELECTRIC COLLEGE BOWL SCHOLARSHIP: $500 cash to a junior man or woman. Applicant must have maintained high scholarship, and have demonstrated individual responsibility and those academic qualities which characterized the members of the successful College Bowl team.

GENERAL MOTORS SCHOLARSHIP: Awarded biennially beginning in 1972-73 to entering freshmen, with preference given to students planning to pursue a career in engineering. Continued for four years if the recipient has financial need and is making satisfactory progress toward graduation.

GILL SCHOLARSHIP: Approximately $500 to a needy American Indian student who is a resident of one of the eleven western states, provided by the William Harris Gill Education Fund.

HERRIN SCHOLARSHIP: Tuition and fees for juniors or seniors, based on high scholarship, unimpeachable character, and service to the University; honoring William and Alice Herrin.

HOLMES SCHOLARSHIP: About $300 awarded annually to a worthy male graduate of a Jackson County high school; provided by Harry and David Holmes of Medford.

HORN SCHOLARSHIP: Approximately $1,500 for a varsity football or basketball player, in honor of Bud Horn.

HOYT SCHOLARSHIPS: Grants of varying amounts from an endowment established by the late Charles H. Hoyt.

JACKSON FOUNDATION SCHOLARSHIPS: Three $1,000 scholarships made possible through a trust established by the late Mrs. Maria C. Jackson in memory of her husband C. S. Jackson, founder of the Oregon Journal. Applicants must be graduates of an Oregon high school. Recipients chosen on the basis of scholastic standing and financial need. Preference given to the son or daughter of any present or former employee of the Oregon Journal.

KECK SCHOLARSHIP: $500 to the incoming freshman athlete who most closely typifies the qualities of the late Mike Keck, OSU varsity basketball player.

LEONORA H. KERR-FOLK CLUB SCHOLARSHIP: Full tuition to an outstanding freshman woman from an Oregon high school; provided by a fund established as a tribute to Mrs. William Jasper Kerr and supplemented by the Oregon State University Folk Club.

NAVAL ROTC SCHOLARSHIPS: (see NAVAL SCIENCE).

NORTH'S SCHOLARSHIP: $1,500 to a southern Oregon student-athlete in any sport, provided by North's Restaurant, Inc.

OREGON STATE UNIVERSITY BOOKSTORE, INC., SCHOLARSHIPS: Full tuition and fees scholarships presented annually to students who have maintained good scholarship and citizenship and who have financial need.

OREGON STATE UNIVERSITY DADS CLUB SCHOLARSHIPS: Tuition and fees to men and women selected by the Oregon State University Dads Club. Recipients chosen on basis of scholastic attainment and financial need.

OREGON STATE UNIVERSITY FOLK CLUB SCHOLARSHIPS: One or more full tuition scholarships to outstanding freshman women from Oregon high schools.

OREGON STATE UNIVERSITY MERIT SCHOLARSHIPS: Two $2,000 scholarships to entering freshmen to be awarded $500 per year for four years. National Merit Award semi-finalists from Oregon and those semi-finalists from out of state who have indicated a preference for Oregon State University are eligible to apply.

OREGON STATE UNIVERSITY MOTHERS CLUB SCHOLARSHIPS: Tuition and fees to men and women selected by Mothers Club Scholarship Committee. Recipients must need financial aid, must be of high character, must have average or above grades. Honor scholarships will be given to a man and a woman with grade-point averages above 3.00.

OSU MOTHERS CLUB-HAWAII UNIT: $300 scholarship for a returning student who is a resident of Hawaii, based on financial need and satisfactory scholastic progress.

OSU PANHELLENIC COUNCIL SCHOLARSHIPS: Two $250 awards annually to sorority members who have made significant contributions to their sororities and the Panhellenic system while maintaining scholastic excellence.

O YATE KI-NATIVE AMERICAN STUDENT ASSOCIATION SCHOLARSHIP: $500 award based on service to the Indian Club during the previous year.

PENDLETON ELKS LODGE SCHOLARSHIP: For an athlete from Ukiah, Pilot Rock, Helix, Athena, or Pendleton.

PHI KAPPA PHI MERIT SCHOLARSHIPS: $500 each to an entering freshman and to an OSU junior, based on academic merit.

RAMSEY SCHOLARSHIP: $500 to a male student, based on citizenship, academic standing, and athletic ability, provided by Frank and Frances Ramsey.

REID SCHOLARSHIP: $500 to an outstanding incoming freshman or varsity basketball player, provided by Dr. and Mrs. David E. Reid.

REYNOLDS SCHOLARSHIP: $500 for an incoming freshman athlete from Union, Wallowa, Baker, or Umatilla county, a memorial to Charles Reynolds.

RITCHIE SCHOLARSHIPS: $400 awards to entering graduates of Oregon high schools who have financial need, outstanding ability, and academic promise; provided by the late Elizabeth P. Ritchie.

SWIFT SCHOLARSHIP: $500 to an incoming male freshman who graduated from a high school in Baker, Grant, Harney, or Malheur county; a memorial to Derald D. Swift.

THRIFT SHOP SCHOLARSHIP: Full tuition to an outstanding freshman woman from a Benton County, Oregon, high school.

VALLEY SCHOLARSHIP: $500 for a varsity letterman in any major sport who has completed his athletic eligibility at OSU; based on financial need and seriousness of purpose in attaining a B.S. degree, a memorial to Wayne Valley, Jr.

VAN KIRK SCHOLARSHIP: Varying amounts to undergraduates in any field; applicants must be U.S. citizens, have financial need, and show academic promise; honoring Mary Van Kirk.

WU SCHOLARSHIP: Honors Hui-O-Hawaii's honorary adviser, Shu Tan Wu, and provides assistance to an enrolled student from Hawaii in financial need.

College of Liberal Arts

KATE L. BARTHOLOMEW JOURNALISM INTERN-SCHOLARSHIP: Annual award of $500 to $1,000 to a sophomore, junior, or senior preparing for a career in journalism. Provided by Frank Bartholomew, chairman of the board and former president of United Press International and an OSU alumnus, in memory of his mother.

KATE L. BARTHOLOMEW JOURNALISM SCHOLARSHIP FUND: $250 annually provided by the Scripps-Howard Foundation in memory of the mother of Frank Bartholomew, Chairman of the Board and former President of United Press International and an OSU alumnus. Granted by the OSU Department of Journalism to one or more undergraduates who intend to pursue journalism as a career and who are willing to work in order to provide a part of their educational expenses.

HAROLD AND RACHEL HOLLANDS SCHOLARSHIP: Approximately $400 annually awarded alternately between art and agricultural economics, in memory of Rachel Hollands. Selection of recipient based on financial need, scholastic achievement, good character, and U. S. citizenship.

INGALLS SCHOLARSHIP: Approximately $400 annually to encourage OSU students toward careers in journalism; includes a summer internship at the Corvallis *Gazette-Times;* provided by Robert C. Ingalls.

LAKE JOURNALISM SCHOLARSHIP: $150 presented annually by the OSU student chapter of Theta Sigma Phi to an OSU woman journalism student in memory of Adelaide V. Lake, former OSU journalism professor.

FRED M. SHIDELER TECHNICAL JOURNALISM SCHOLARSHIP: Annual award of $100 to an incoming freshman majoring in technical journalism. Funds provided by the OSU chapter of Sigma Delta Chi, professional journalistic society, in honor of Fred M. Shideler, head of the OSU Department of Journalism 1932-1967, and member of the OSU faculty for 40 years.

D. PALMER YOUNG MEMORIAL DRAMA SCHOLARSHIP: Partial tuition awarded annually to a student who, in the judgment of the university theater staff, shows the greatest promise of contribution to the Oregon State University Theater program and has financial need.

College of Science

BENTON COUNTY MEDICAL SOCIETY SCHOLARSHIP: $500 to an undergraduate premedical student. Selection based on scholarship, financial need, and qualities such as personality and ability determined by personal interview. Recipient need not be an Oregon resident, and may be of any race, color, or creed.

COPSON SCHOLARSHIP: Approximately $200 annually from a gift of June Seeley Copson '15 to establish a scholarship in memory of her husband Godfrey Vernon Copson '11, formerly head of the Bacteriology Department. Award made to a junior or senior who shows outstanding promise in the College of Science.

PAUL COPSON MEMORIAL SCHOLARSHIPS: Approximately $200 annually from the bequest of June Seeley Copson '15 for each of two scholarships, one in physics and one in mathematics. Awards made to juniors or seniors on the basis of character, promise in scholarship, and general scientific aptitude.

HARRIS SCHOLARSHIPS: $500 each to a chemistry and a biochemistry major. Selection based on scholarship and financial need. Funds provided by Dr. Milton Harris, an OSU alumnus.

LONGVIEW FIBRE COMPANY PULP AND PAPER UNDERGRADUATE SCHOLARSHIP: $500 to a worthy sophomore or junior in chemistry. Selection based on need of financial assistance, scholarship, professional interest, and personal qualities. Recipient must be a permanent U. S. resident. Summer employment with company may be available.

PROCTER AND GAMBLE COMPANY SCHOLARSHIP IN ENVIRONMENTAL BIOLOGY: $250 to a senior majoring in microbiology, application to be made during junior year. Financial need and academic achievement considered but no minimum levels required for consideration.

JOSEPH E. SIMMONS MEMORIAL SCHOLARSHIP: $200 or more to a worthy and promising student in microbiology. Established by the widow and friends of the late Professor Joseph E. Simmons, formerly head of the Bacteriology Department.

STANDARD OIL COMPANY OF CALIFORNIA SCHOLARSHIP: $750 to a worthy sophomore or junior geology major nominated by the faculty of the Department of Geology. Candidates must be citizens of the U.S. or holders of permanent immigration visas.

UNION OIL COMPANY OF CALIFORNIA FOUNDATION SCHOLARSHIP: $500 to a worthy undergraduate geology major nominated by the faculty of the Department of Geology on the basis of scholastic achievement, extracurricular activities, and good citizenship. Candidates must be U. S. citizens.

School of Agriculture

AGRICULTURAL ECONOMICS AGRIBUSINESS SCHOLARSHIPS: These scholarships provide cash awards equivalent to one year regular tuition for two majors in Agricultural Economics with apparent high capacity for success in Agribusiness. Selection based on scholarship, aptitude for business, desire to pursue an agribusiness vocation, and related factors.

AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS STUDENT BRANCH SCHOLARSHIP: $50 to an incoming freshman in agricultural engineering. Provided by the Oregon State Student Branch of ASAE.

P. M. BRANDT AND G. H. WILSTER MEMORIAL SCHOLARSHIP: One year tuition to a freshman, sophomore, junior, or senior majoring in food science and technology, or dairy microbiology. Sponsored by the Oregon Dairy Industries.

BUMBLE BEE SEAFOODS, INC. SCHOLARSHIP: $1,000 annually to a junior or senior in food science and technology, supported by work in selected engineering courses, with potential summer employment between junior and senior years and renewal of scholarship during the senior year. Limited to students with sincere interest in career in commercial fisheries industry.

DON BURLINGAME SCHOLARSHIPS: Endowment fund to provide scholarships or work scholarships for sophomores, juniors, and seniors enrolled in Soil Science, Agronomic Crop Science, or Horticulture. Preference given to students with financial need and qualities of citizenship, leadership, and character.

DEL MONTE SCHOLARSHIP: $300 to a junior in food science and technology. Selection based largely on past academic performance and sincere interest in food technology.

FIRST NATIONAL BANK OF OREGON SCHOLARSHIP: $500 for a senior in agricultural economics. Limited to Oregon residents and awarded on the basis of scholastic achievement, leadership, and financial need.

H. H. GIBSON MEMORIAL SCHOLARSHIP: Approximately $250 provided annually as a memorial to Professor Gibson by his family, for an Oregon high school graduate in vocational agriculture.

HAROLD AND RACHEL HOLLANDS SCHOLARSHIP: Approximately $400 annually awarded alternately between agricultural economics and art in memory of Rachel Hollands. Selection of recipient based on financial need, scholastic achievement, good character, and U.S. citizenship.

G. R. HYSLOP MEMORIAL FOUNDATION SCHOLARSHIPS: Tuition and fees for one year; one to an outstanding high school senior and one to a junior in agronomic crop science.

KIWANIS CLUB OF SOUTH RIVERSIDE AND SOUTH RIVERSIDE KIWANIS FOUNDATION SCHOLARSHIP: $225 annually to a senior in fisheries and wildlife. Award based on scholastic ability and financial need. Recipient must be a resident of Oregon, preferably from the greater Portland area.

URSULA BOLT KNAUS SCHOLARSHIP: Full tuition to a student above the freshman level. Awarded on alternate years to a student in the School of Agriculture who has financial need and at least a 2.50 accumulative grade-point-average.

EZRA J. KRAUS MEMORIAL SCHOLARSHIP: $300 annually to entering freshman interested in a career in floriculture or nursery management. Hand written letter indicating hobbies, work or real interest in ornamental plant line should accompany scholarship application. Deadline May 1.

LAMB-WESTON, INC. SCHOLARSHIP: $400 to an entering freshman in food technology from a high school in the general area of Weston, Oregon.

MCKENZIE SCHOLARSHIP: $150 provided as a memorial to Gary McKenzie by his parents, for a freshman in agriculture who has been an active member of Future Farmers of America.

MILWAUKIE ROD AND GUN CLUB SCHOLARSHIP: $100 annually for an outstanding senior in fisheries and wildlife. Preference given qualified students from the Milwaukie area. Selection based on scholastic ability, leadership, career interest in fisheries and wildlife, and financial need.

MOORE-RANE MANUFACTURING COMPANY SCHOLARSHIP: $100 to an incoming freshman in agricultural engineering. Provided by the Moore-Rane Manufacturing Company.

NORTH WILLAMETTE VALLEY HORTICULTURE SOCIETY SCHOLARSHIP: One $50 scholarship to an incoming freshman student from Multnomah, Clackamas, or Columbia County, who has expressed an interest and intent to major in horticulture.

NORTHWEST FOOD PROCESSORS ASSOCIATION SCHOLARSHIP: $100 to an outstanding junior in food technology.

OREGON BEEF INDUSTRY SCHOLARSHIP: A minimum of $200 to an outstanding sophomore or junior in Animal Science Department. Selection based on scholarship, personal characteristics, and financial need, plus evidenced interest in beef cattle industry.

OREGON FEDERATION OF GARDEN CLUBS SCHOLARSHIPS: Two $300 grants-in-aid for sophomores or upperclassmen, one in landscape architecture and one in ornamental horticulture.

OREGON FRYER COMMISSION SCHOLARSHIPS: Two $500 scholarships awarded annually to propagate the expressed interest in poultry science of sophomore, junior, and senior students. Freshman may be considered if exceptional ability and interest has been demonstrated.

OREGON TURKEY IMPROVEMENT ASSOCIATION SCHOLARSHIP: $500 for a junior or senior in poultry science interested in some phase of the turkey industry. Preference given to Oregon residents and students who anticipate working in Oregon's turkey industry.

PACIFIC NORTHWEST PLANT FOOD ASSOCIATION SCHOLARSHIP: $250 to an outstanding junior or senior in School of Agriculture majoring in soils.

RALSTON PURINA COMPANY SCHOLARSHIPS: $500 each, annually, to outstanding seniors in agriculture in land-grant colleges of the United States. Oregon State seniors in this field who rank in the upper 25% of the class and who have financial need may apply through dean of agriculture.

ROHM AND HAAS SCHOLARSHIP: Two $500 scholarships for juniors or seniors in plant pathology, entomology, or agronomy. Chosen by the School of Agriculture Scholarships Committee from recommendations of the departments indicated.

BILL SCHAFFER MEMORIAL SCHOLARSHIP: $100 provided by Multnomah Anglers and Hunters Club for a sophomore major in fisheries and wildlife in recognition of his accomplishments and to promote continued excellence in his studies in wildlife conservation and management.

CHAN SCHENCK CONSERVATION SCHOLARSHIP: $200 provided by Multnomah Anglers and Hunters Club for a junior or senior majoring in fisheries and wildlife to assist him in continuing his studies in wildlife conservation and management.

STAYTON CANNING COMPANY COOPERATIVE SCHOLARSHIP: $300 to an incoming freshman in agricultural engineering from one of the following high schools: Cascade, Dayton, Jefferson, Regis, Scio, Silverton, and Stayton. Provided by the Stayton Canning Company Cooperative.

UNITED FARM AGENCY SCHOLARSHIP: $500 annually to a senior in agriculture. Selection based on financial need, qualities of leadership, and activity in chosen field.

R. M. WADE FOUNDATION SCHOLARSHIP: $300 annually for a junior or senior majoring in agricultural education.

WESTERN ROD AND REEL CLUB SCHOLARSHIP: $300 annually to a junior or senior majoring in wildlife or fisheries. Selection based on real financial need, ambition and desire for further study, and scholastic accomplishment.

School of Business and Technology

ARTHUR YOUNG AND COMPANY SCHOLARSHIP: $250 awarded annually to an outstanding student in the field of accounting; recommendation by accounting faculty, primarily on basis of scholarship and professional promise.

BERTHA W. STUTZ-CORVALLIS WOMAN'S CLUB SCHOLARSHIP: $300 annually to a sophomore, junior, or senior girl from the Corvallis area who is majoring in business education or office administration; award based on merit and need. Selection by Corvallis Woman's Club Scholarship Committee from nominations by departments of Business Education and Office Administration.

FIRST NATIONAL BANK OF OREGON SCHOLARSHIP: $500 awarded annually to a student with prime interest in finance and banking. Selection made by a representative group of faculty of the Department of Business Administration.

MARSHALL AND MELISSA MARTIN DAWES SCHOLARSHIP: One $178.50 scholarship to a senior man or woman in the School of Business and Technology who is academically deserving and has financial need.

PEAT, MARWICK, MITCHELL AND COMPANY SCHOLARSHIP: Two $250 scholarships annually to students in the field of accounting; recommendation by accounting faculty, primarily on basis of scholarship and professional promise.

PRICE WATERHOUSE FOUNDATION SCHOLARSHIP: $500 annually to a student(s) in business administration with a concentration in accounting. Selection by accounting faculty, based on scholarship and professional promise.

STANDARD OIL COMPANY OF CALIFORNIA UNDERGRADUATE SCHOLARSHIP: $750 annually provided by the Standard Oil Company of California for an undergraduate student in business administration with an area of concentration in accounting.

UNITED FARM AGENCY SCHOLARSHIPS: Two $500 scholarships annually to juniors who are minoring in Agriculture or who demonstrate an interest in real estate and finance, for use their senior year. Selection criteria include scholastic achievement and financial need.

WESTERN KRAFT SCHOLARSHIPS: Two $360 scholarships provided by the Western Kraft Corporation to juniors in the School of Business and Technology for their senior year. Candidates must be U. S. citizens.

School of Education

PARENT-TEACHER SCHOLARSHIPS: $250 annually with a maximum of $1,000, to encourage capable young people to enter elementary or secondary teacher training in Oregon. Open to freshmen, sophomores, and juniors; award based on scholarship, character, personality, leadership, school citizenship, and sound health. Apply through the Oregon Congress of Parents and Teachers, 603 Loyalty Building, Portland.

EVA M. SEEN SCHOLARSHIP: $100 annually to an incoming senior woman in professional physical education; award based on professional interest, womanliness in appearance and character, leadership, and scholarship. Recipient must be a member of Parthenia (Women's Physical Education Honorary).

School of Engineering

ALCOA SCHOLARSHIPS: $600 each to two seniors in electrical, mechanical, or industrial engineering, provided by the Aluminum Company of America Foundation.

ASCE SCHOLARSHIP: Full tuition for a senior in civil engineering, provided by the American Society of Civil Engineers (Oregon Section).

AUXILIARY TO THE PROFESSIONAL ENGINEERS OF OREGON SCHOLARSHIP: $500 to an Oregon junior in engineering with a 3.00 GPA and indicated need; renewable for a second year.

BECHTEL SCHOLARSHIP: $500 to a junior or senior in engineering, provided by the Bechtel Foundation.

BOEING SCHOLARSHIPS: $500 each to three juniors or seniors majoring in civil, electrical, or mechanical engineering.

CENTRAL LINCOLN PUD SCHOLARSHIP: Tuition and $150 for books and fees for an entering electrical engineering male freshman from a high school in the service area of the Central Lincoln Peoples Utility District.

RALPH A. CHAPMAN MEMORIAL SCHOLARSHIPS: Variable amount to a sophomore, junior, or senior in the School of Engineering. Selection based on scholarship and financial need.

CHEMICAL ENGINEERS OF OREGON SCHOLARSHIP: Tuition for an entering freshman or a sophomore in chemical engineering; based on scholarship, potential, and financial need.

COVERT SCHOLARSHIP: Approximately $200 to a freshman in chemical engineering; based on scholarship, ability, and potential leadership; provided by the late Lloyd W. Covert.

DOW SCHOLARSHIP: $300 each to three entering freshmen in chemical engineering; based on scholarship, potential, and financial need; provided by the Dow Chemical Company.

DUPONT SCHOLARSHIP: $300 each to three entering freshmen in chemical engineering; based on scholarship, potential, and financial need.

ESCO SCHOLARSHIP: $500 to a senior graduating in the top 25% of his class, who has an interest in manufacturing processes or metallurgy and will accept summer employment at the ESCO plant in Portland.

FOUNDRY EDUCATION SCHOLARSHIPS: $2,000 to students interested in the foundry industry, provided by the Foundry Education Foundation.

FREIGHTLINER SCHOLARSHIPS: $200-$500 each to several juniors or seniors in mechanical engineering.

HERMANN SCHOLARSHIP: Approximately $500 annually to one or more seniors in civil engineering, in memory of Otto Hermann.

MCCALL SCHOLARSHIP: Income from a memorial fund for a faculty-selected senior in civil engineering, provided in the name of the late Jim McCall.

KAISER SCHOLARSHIP: $2,500 to a junior in industrial engineering, interested in an industrial career, for assistance in his first year of a master's degree program; provided by the Kaiser Aluminum and Chemical Corporation.

URSULA BOLT KNAUS SCHOLARSHIP: Full tuition scholarship awarded on alternate years to a sophomore, junior, or senior majoring in electrical engineering. Selection based on financial need, qualities of leadership, and activity in chosen field.

LONGVIEW FIBRE PULP AND PAPER SCHOLARSHIPS: Three $500 awards to sophomores, juniors, or seniors in mechanical or chemical engineering.

3M SCHOLARSHIPS: Three $500 awards to sophomores, juniors, or seniors, based on academic accomplishment and financial need; provided by the Minnesota Mining and Manufacturing Company.

PAPER INDUSTRY MANAGEMENT ASSOCIATION SCHOLARSHIP: $500 to a junior or senior in chemical, civil, electrical, industrial, or mechanical engineering; based on scholastic standing and financial need.

PETER KIEWIT SONS' SCHOLARSHIPS: Awards in varying amounts to students in civil engineering and civil engineering technology.

ITT-RAYONIER SCHOLARSHIPS: $600 each to two seniors who are U. S. citizens, one in chemical engineering and one in mechanical, electrical, or civil engineering; provided by ITT-Rayonier Foundation.

SME SCHOLARSHIP: Awarded to a junior, senior, or graduate student in manufacturing engineering technology or related programs, provided by the Portland Chapter of the Society of Tool and Manufacturing Engineers.

STANDARD OIL SCHOLARSHIPS: $300 each to three entering freshmen in chemical engineering; based on scholarship, potential, and financial need; $750 each to four undergraduate students, one in chemical engineering, one in electrical engineering, and two in mechanical engineering; provided by the Standard Oil Company of California.

WESTERN ELECTRIC FUND SCHOLARSHIP: Variable amount to a student in electrical or mechanical engineering above the freshman year, preferably to a junior.

WESTERN KRAFT SCHOLARSHIP: $500 each to three upper division engineering students who are U.S. citizens, provided by the Western Kraft Corporation.

School of Forestry

ALBERT H. POWERS MEMORIAL SCHOLARSHIP: Income from an endowment fund, to an outstanding student in forestry. A memorial to Albert H. Powers, prominent Oregon livestock man, for many years a representative of this industry on the Oregon State Board of Forestry.

AUFDERHEIDE MEMORIAL SCHOLARSHIP: Income from an endowment fund, a memorial to Robert Aufderheide, class of 1935, to an outstanding forestry student.

AUTZEN FOUNDATION SCHOLARSHIP: $550 provided for an outstanding student in forestry.

BERUBY SCHOLARSHIPS: Three $825 annual awards from anonymous donors to students majoring in forest engineering, forest management, or forest products. Selection based on high scholarship, potential for success in the profession, and active participation in School and/or University affairs.

COLE, CLARK, AND CUNNINGHAM, INC. SCHOLARSHIP: $500 to an outstanding senior in forest management, forest engineering, or forest products.

CRAHANE MEMORIAL SCHOLARSHIPS: Two $500 scholarships provided from an endowment fund for outstanding Oregon freshmen entering the School of Forestry and majoring in forest management, forest engineering, or forest products. A memorial to Joe M. Crahane, prominent Oregon lumberman.

FRERES SCHOLARSHIP: $500 for an outstanding freshman in forestry with first preference to graduates of Regis, Stayton, Detroit, Mill City, or Cascadia high schools, second preference to any graduate of a Marion County high school; a memorial to Harold "Bud" Freres.

GORDON AND PRISCILLA DUNCAN SCHOLARSHIP: Income from endowment fund for a deserving forestry student, preferably in forest products, nominated by forestry faculty.

HART SCHOLARSHIP: Income from an endowment fund, a memorial to Floyd Hart, prominent Oregon lumberman, for a senior in forest management, forest engineering, or forest products.

ROBERT F. KENISTON MEMORIAL SCHOLARSHIP: Estahlished in 1971 by Mrs. Keniston, her family, and friends. Awarded annually to an upper division student in forestry who demonstrates sincerity of purpose, good character, high scholarship and potential for success in the profession. No restriction as to major, residence, or sex. Selection by School of Forestry Scholarship Committee with preference given to forest management majors.

OREGON LOGGING CONFERENCE SCHOLARSHIP: $500 each for three deserving, faculty-selected students majoring in forest engineering, forest products, or forest management.

PAUL M. DUNN SENIOR SCHOLARSHIP: Income from an endowment established in 1964 by Paul M. and Neva K. Dunn. Awarded annually to the outstanding senior in the School of Forestry. Based on scholastic achievement and potential professional ahility.

RANDALL MEMORIAL SCHOLARSHIP: Income from an endowment fund, a memorial to "Casey" Randall, forestry faculty member; awarded annually to forest engineering, forest management, or forest products student chosen by School staff.

ITT-RAYONIER FOUNDATION SCHOLARSHIP: $600 for an upper division student in forestry; based on high scholarship and need.

ROGUE VALLEY HOO HOO CLUB SCHOLARSHIP: $500 to an outstanding forest products student with emphasis in wood industry management. Preference given students from the Josephine-Jackson County area, with selection by School of Forestry Scholarship Committee.

ST. REGIS PAPER COMPANY SCHOLARSHIP: $1,600 provided by the St. Regis Paper Company to an outstanding forestry student extending through his junior and senior years. Recipient selected from juniors nominated from Schools of Forestry at Washington State University, University of Idaho, University of Washington, University of Montana, and Oregon State University.

SIERRA-CASCADE LOGGING CONFERENCE FORESTRY SCHOLARSHIPS: $1,000 for two juniors in forest engineering, forest management, or forest products at OSU or other western forestry schools who are residents of Oregon, California, or Nevada.

SLATER MEMORIAL SCHOLARSHIP: Income from an endowment fund, a memorial to Durward F. Slater, class of 1952, to an upper division forestry student. Preference given to forest management majors.

D. WYLIE SMITH III MEMORIAL SCHOLARSHIP: Income from an endowment fund to an outstanding student majoring in forest engineering, forest management, or forest products. First preference given to students from Coos, Curry, or western Douglas Counties with selection by Coos Chapter Society of American Foresters from nominees suhmitted by School of Forestry Scholarship Committee.

SNELLSTROM SCHOLARSHIP: Income from endowment fund, a memorial to John R. Snellstrom, prominent Oregon lumherman and legislator, for outstanding forestry student in forest management, forest engineering, or forest products. Selection by School of Forestry Scholarship Committee.

SOUTH SANTIAM EDUCATIONAL AND RESEARCH PROJECT SCHOLARSHIPS: $13,500 annually provided by the Louis W. and Maud Hill Family Foundation for 15 Oregon students enrolled in forest engineering, forest products, or forest management (five students in each of the sophomore, junior, and senior years).

MARGARET O. STARKER MEMORIAL SCHOLARSHIP: Income from a bequest to further forestry education and research at Oregon State University School of Forestry; awarded to a deserving student selected by forestry staff.

TUCKER SCHOLARSHIPS: Three $1,000 scholarships, provided by the will of Max D. Tucker, for Oregon students in forestry.

School of Home Economics

BUENA M. STEINMETZ SCHOLARSHIP: $100 to a junior, senior, or graduate student, man or woman, majoring in child development or family relationships; in memory of Buena M. Steinmetz.

LEONE ELLIOTT COVERT SCHOLARSHIP: Approximately $200 to a freshman student in Home Economics; provided by the late Mrs. Covert. Award made on basis of scholarship, ability, and potential leadership.

ELECTRICAL WOMEN'S ROUND TABLE OF OREGON SCHOLARSHIP: $150 to a junior, awarded on basis of financial need, scholarship, and interest and aptitude in electrical equipment.

INTERNATIONAL FRIENDSHIP SCHOLARSHIP: For an upper division or graduate student from a foreign country studying home economics at Oregon State; provided by the OSU student Chapter of the Oregon Home Economics Association.

JACKSON COUNTY HOME EXTENSION SCHOLARSHIP: $300 to a young woman, preferably a sophomore, junior, or senior, from Jackson County seeking a career in home economics; awarded on the basis of financial need, high scholarship, and an interest and aptitude in this field.

HELEN MCDOWALL MEMORIAL SCHOLARSHIP: $100 to a sophomore, junior, or senior from Clackamas County enrolled in the School of Home Economics: award based on scholarship, financial need, interest, and aptitude for home economics.

AZALEA AND CHARLES SAGER SCHOLARSHIP: $200 annually to a worthy junior or senior in the School of Home Economics, preferably one who lives in Azalea House.

UNITED FARM AGENCY SCHOLARSHIP: $500 annually to a senior in Home Economics with selection based on financial need, qualities of leadership, and activity in chosen field.

See SCHOOL OF PHARMACY for Pharmacy scholarships.

For Foreign Students

The following scholarships and fellowships, both undergraduate and graduate, are available to assist foreign students attending Oregon State.

GERTRUDE STRICKLAND SCHOLARSHIP: A fund to provide financial assistance to foreign students. Awards are made by University Scholarships Committee to a limited number of qualified foreign students.

INTERFRATERNITY COUNCIL SCHOLARSHIPS: Three one-year scholarships to foreign students enrolled in Pavia, Stuttgart, and Waseda Universities. The scholarship includes a foreign student scholarship and one year of room and board in a fraternity at Oregon State University.

MILAM FELLOWSHIP: For an undergraduate or graduate woman foreign student in home economics, established in tribute to Ava B. Milam Clark, dean of the School of Home Economics 1917-1950.

Administered by Other Agencies

CORVALLIS ROTARY CLUB SCHOLARSHIP: Tuition and fees to a graduate of a Benton County high school or a resident of Benton County who, because of school boundaries, attended high school in a neighboring county. Application submitted to the Scholarship Committee of the Corvallis Rotary Club through the club president. Application should express financial need, educational interests and goals in a letter of not more than two typewritten pages.

CROWN ZELLERBACH FOUNDATION SCHOLARSHIPS: $750 per year for four years to students in education. Information through high school principals.

EASTERN STAR SCHOLARSHIPS: Scholarships provided by the Grand Chapter of Oregon of the Order of Eastern Star for members or daughters of members completing the junior year in Oregon colleges and in need of financial assistance for the senior year.

FORESTRY MEMORIAL SCHOLARSHIP: Income from funds contributed as memorials to graduates and friends of the School of Forestry to a worthy student; administered through Oregon State University Alumni Association.

4-H FUTURE FARMERS OF AMERICA, AND FUTURE HOMEMAKERS OF AMERICA SCHOLARSHIPS: Members should make inquiries to teachers and club leaders regarding local scholarship opportunities.

INSTITUTE OF FOOD TECHNOLOGISTS UNDERGRADUATE SCHOLARSHIP: $300 annually to a freshman in field of food technology. Application made on official form to head of department. Selection by Committee on Education, Institute of Food Technology.

MARIA C. JACKSON-GENERAL GEORGE A. WHITE STUDENT-AID FUND FOR CHILDREN OF WAR VETERANS: Two $750 scholarships annually (one to a man, one to a woman) to children of war veterans; selection based on need and scholarship. Application through United States National Bank of Portland.

MCCLINTOCK MEMORIAL SCHOLARSHIP: $150 to an outstanding junior in animal hushandry or range management; provided through funds established by the Oregon Farm Bureau Federation as a memorial to L. A. McClintock, well known Oregon stockman. Recipients selected by the Board of Directors of the Oregon Farm Bureau Federation.

NORTHWEST CANNERS AND FREEZERS ASSOCIATION SCHOLARSHIP: $100 annually to an outstanding junior majoring in food technology.

OREGON HOME ECONOMICS ASSOCIATION SCHOLARSHIP: $500 over a four-year period awarded a senior in an Oregon high school for enrollment as a home economics major in an Oregon college granting a degree in home economics. Application through high school teacher of home economics.

OREGON STATE EMPLOYEE'S ASSOCIATION SCHOLARSHIPS: Three $300 scholarships to students whose parents are members of O.S.E.A. Selection based upon scholastic achievement and financial need.

OREGON STATE EMPLOYEE'S ASSOCIATION SCHOLARSHIP (OSU Faculty Chapter No. 72): $100 annually to a son or daughter of a chapter member; for outstanding scholastic achievement.

P.E.O. SCHOLARSHIPS: Provided by Oregon State Chapter of P.E.O. for Oregon junior or senior women, outstanding and worthy of financial assistance.

PEPSODENT PRESIDENTIAL SCHOLARSHIP: $100 a year for freshman in pharmacy to be continued for five years if scholarship is maintained. Awarded on basis of scholastic ability and financial need. Selection by Oregon State Pharmaceutical Association.

PORTLAND HOME ECONOMICS IN EDUCATION SCHOLARSHIP: One scholarship for $300 to freshmen majoring in home economics in an Oregon college.

PORTLAND ROSE FESTIVAL SCHOLARSHIP: Tuition and fees for members of the royal court who enroll at Oregon State University.

UNION PACIFIC RAILROAD SCHOLARSHIPS: $200 each for study of agriculture or home economics to an outstanding 4-H Club member in each county in Oregon served by Union Pacific Railroad.

WAR ORPHANS EDUCATIONAL ASSISTANCE ACT OF 1956: A student whose parent died from causes incurred in World War I, World War II, or the Korean Conflict, who is between the ages of 18 and 23, and who has completed high school, may apply for 36 months of education and training at Oregon State University. The act provides $110 per month for full-time training. Eligible students should apply to the Veterans Administration.

WILLAMETTE INDUSTRIES SCHOLARSHIPS: $550, $676, and $776 awarded to beginning sophomores, juniors, and seniors, respectively, enrolled in forestry, business, or engineering. Scholarships are contingent upon student working during the summer at one of Willamette Industries' operations.

E. E. WILSON SCHOLARSHIPS: Annual assistance grants up to $800 each, from a trust fund provided in the will of E. E. Wilson, Corvallis banker and attorney. Awards, based primarily on financial need, followed by character and scholastic attainments, granted to deserving young men and women who are bona fide residents of Benton County. To apply, eligible students should submit a letter to the E. E. Wilson Scholarship Awards Committee, Mr. Fred C. Zwahlen, Jr., Coordinator, Agriculture Hall 229, Oregon State University.

Honors and Awards

High scholarship is recognized at Oregon State in several ways:

Junior Honors, presented at the end of a student's sophomore year.
Senior Honors, presented at the time of graduation.
Election to membership in various honor societies.
Personal awards, which may take the form of certificates, plaques, money prizes, or items of intrinsic value.

General honors and awards may be won by students in any school or curriculum. Other awards are open to students in particular schools or departments. Oregon State students compete for awards provided by national and regional sponsors in many fields as well as for essay and oratorical prizes, awards for proficiency in special fields, and awards for all-round distinction.

JUNIOR HONORS: Conferred by the Oregon State Chapter of Phi Kappa Phi on students who have completed at least 45 term hours of sophomore work at Oregon State with a grade-point average of at least 3.50.

SENIOR HONORS: Conferred each year by the Faculty Senate on those candidates for the baccalaureate degree who have maintained high scholastic standing in their respective schools and who have been in attendance at Oregon State University for at least two regular academic years. The designation *With Highest Scholarship* is conferred upon those students graduating with a cumulative GPA of 3.75 or better; the designation *With High Scholarship* is conferred upon students with a GPA of at least 3.25, but less than 3.75.

CHI OMEGA AWARD: An annual award of $50 to the senior woman who is adjudged by a college committee on honors and awards to approach most nearly an ideal of intellect and spirituality and to have exerted the most wholesome influence upon her associates.

DELTA DELTA DELTA AWARDS: Yearly awards of $75 each made to two women students judged to have exerted, through personal resourcefulness and unselfish effort, the most constructive influence on their associates during the academic year.

DUBACH AWARDS: Presented annually by Oregon State chapter of Blue Key to five graduating senior men outstanding in perpetuation of high ideals and unselfish service to Oregon State University; in honor of Dr. U. G. Dubach, dean of men 1913-1947; names are inscribed on plaque in foyer of Library.

MACKENZIE-BLUE KEY MEMORIAL AWARD: In memory of Donald Wilson MacKenzie, class of 1953, to any man student who exhibits outstanding qualities and ability as a student leader and in service and loyalty to the institution. Cash and plaque.

OSU OUTSTANDING STUDENT AWARDS: Presented to an outstanding man and woman student in each class with scholarship, leadership, character, and contributions to the campus considered. These awards are a memorial to Clara H. Waldo.

OSU SCHOLARSHIP AND LEADERSHIP AWARDS: Presented to selected freshmen, sophomore, junior, and senior men and women students, based on scholarship and leadership, as a memorial to Edward A. Cummings. Two awards each to freshmen and sophomore men and women; three awards each to junior and senior men and women.

OSU SCHOLASTIC AWARDS: Presented to the man and woman in the sophomore, junior, and senior classes who have the highest grade-point averages for their five, eight, or eleven terms. These awards are a memorial to Drucilla Shepard Smith.

College of Liberal Arts

ALPHA CHI OMEGA AWARD: Presented by the Portland Chapter to the girl who contributes most in rendering service to the Music Department, to the university, and to the community. Name of recipient engraved on a cup.

BAROMETER AD TROPHY: Awarded to *Daily Barometer* advertising solicitor who has contributed most to financial health of student newspaper.

BAROMETER AWARD: Trophy to the freshman student who has contributed most to general welfare and improvement of the *Daily Barometer*, student newspaper.

ALICE CAREY DILWORTH SENIOR AWARDS $100 presented annually to the outstanding senior in music on the basis of scholarship and professional ability. Name of recipient engraved on a plaque.

INGALLS AWARD: Trophy given annually to the senior who has contributed most to the welfare of student publications; award is recorded on a plaque, a memorial to Claude E. Ingalls, formerly editor of the Corvallis *Gazette-Times*.

"PROF MAC" MEMORIAL PLAQUE: Awarded annually to the day and night editors of the *Daily Barometer* who have excelled in typographical proficiency and have contributed most to general news excellence. Provided by Dr. Charles D. Byrne in memory of the late C. J. McIntosh, founder of journalism at Oregon State and staff member 28 years.

SIGMA DELTA CHI CITATION: Certificate awarded by national organization to outstanding senior interested in journalism.

SIGMA DELTA CHI SCHOLARSHIP AWARD: Certificates awarded to Journalism seniors in recognition of high scholastic standing in all college work.

Honor and Recognition Societies

Organization	Men or women	Date established nationally	Date established at Oregon State	Type or field of interest
General Honor Societies				
Alpha Lambda Delta	W	1924	1933	Freshman scholarship
Blue Key	M	1924	1934	Senior leadership
Mortar Board	W	1918	1933	Senior leadership
Phi Eta Sigma	M	1923	1949	Freshman scholarship
Phi Kappa Phi	Both	1897	1924	Scholarship
Sigma Xi	Both	1886	1937	Science Research
Departmental Honor Societies				
Alpha Pi Mu	Both	.....	1969	Industrial Engineering
Beta Alpha Psi	Both	1919	(1923) 1959	Accounting
Beta Gamma Sigma	Both	1913	1963	Business
Eta Kappa Nu	Both	1904	1921	Electrical Engineering
Kappa Delta Pi	Both	1911	1928	Education
Omicron Nu	Both	1912	1919	Home Economics
Pi Delta Phi	Both	1906	1962	French
Pi Tau Sigma	M	1916	1941	Mechanical Engineering
Rho Chi	Both	1908	1942	Pharmacy
Tau Beta Pi	M	1885	1924	Engineering
Xi Sigma Pi	Both	1908	1921	Forestry
Professional Fraternities				
Alpha Zeta	M	1897	1918	Agriculture
Lambda Kappa Sigma	W	1913	1930	Pharmacy
Phi Chi Theta	W	1924	1924	Commerce (Secretarial Science)
Women in Communications	W	1909	1925	Journalism
Zeta Phi Eta	W	1893	1967	Speech
Recognition Societies				
Angel Flight	W	.....	1961	Air Force
Army Sponsor Corps	W	1964	.....	Service (Army ROTC)
Arnold Air Society	M	1947	1951	Air Force
Beaver Belles	W	.....	1959	Athletic Greeters
Mu Beta Beta	Both		1928	4-H
Phi Lambda Upsilon	M	1899	1928	Chemistry
Phi Sigma	Both	1915	1933	Biology
Scabbard and Blade	M	1904	1920	Military
Other Societies				
Euterpe	W	.....	1920	Music
Talons	W	.....	1933	Service
Thanes	M	.....	1936	Service

SIGMA DELTA PI SPANISH AWARD. A Spanish masterpiece and the medal of the American Association of Teachers of Spanish given annually to the advanced student of Spanish who has made the greatest progress during the academic year.

ROBERT WAYNE SMITH BOOK AWARD: $100, $60, $40 for purchase of books from the OSU bookstore awarded annually to three undergraduates. Selection based on best 1,000-1,500-word essay reviews of a non-technical book.

College of Science

IOTA SIGMA PI AWARDS: A $25 gift certificate for books given to a junior girl in chemistry or a closely related field; for high academic standards. A Chemical Rubber Handbook of Chemistry and Physics to a freshman girl in chemistry with the highest GPA.

JEROME C. R. LI AWARD: Name of an outstanding graduate student in statistics engraved on plaque and student membership in the Institute of Mathematical Statistics.

MERCK AND COMPANY AWARDS: Chemical books valued at $15 awarded to two seniors for high academic standards and leadership qualities in chemistry.

PHI LAMBDA UPSILON AWARD: Certificate of merit to an outstanding undergraduate student in chemistry and chemical engineering; recipient's name engraved on plaque in Chemistry Hall.

PHI SIGMA AWARDS: Two certificates to the outstanding undergraduate and graduate students who have shown creative interest in biology.

PI MU EPSILON-DEPARTMENT OF MATHEMATICS AWARD: $35 for first place and $20 for second place in a mathematics competition for freshmen and sophomores; winner's name to be engraved on plaque.

PHYSICS UNDERGRADUATE AWARD: An annual award of $100 for the best original paper submitted by an undergraduate physics major on any subject in physics.

School of Agriculture

AGRICULTURAL COOPERATIVE COUNCIL OF OREGON AWARD: An annual award equivalent to one term tuition to a junior or senior in agricultural economics who has shown interest in farmer cooperatives and agricultural business management. In honor of Paul Carpenter, long a devoted Agricultural Extensionist at Oregon State University, and Council Secretary.

ALPHA GAMMA RHO SOPHOMORE AWARD: Rotating trophy to student in agriculture who has completed 90 term hours with a grade-point average of at least 2.75 and who is enrolled for his seventh term in college; purpose to promote scholarship, develop leadership and character.

ALPHA ZETA FRESHMAN AWARD: Awarded during the first term of the sophomore year to the student in agriculture receiving the highest grade average in the freshman class.

ARTHUR G. B. BOUQUET HORTICULTURE AWARD: Annual award of $100 to a selected junior or senior in horticulture.

BURPEE AWARD IN HORTICULTURE: $100 to an outstanding student in horticulture majoring in floriculture or vegetable crops.

DANFORTH AWARD IN AGRICULTURE: Expenses for two weeks in St. Louis, Missouri, and two weeks in a Michigan summer camp; provided by the Danforth Foundation and Ralston-Purina Mills of St. Louis, for outstanding agriculture students.

S. B. HALL MEMORIAL AWARD IN ANIMAL SCIENCE: $275 to the outstanding junior in Animal Science majoring in Dairy Production.

THE OREGON SOCIETY OF FARM MANAGERS AND RURAL APPRAISERS AWARD IN AGRICULTURAL ECONOMICS: A cash award equivalent to one term's tuition to an outstanding sophomore or junior majoring in agricultural economics at Oregon State University.

ERNEST H. WIEGAND AWARD: $100 and name of outstanding senior in food technology inscribed on plaque in foyer of Food Technology Building. Selection by Oregon section and student chapter of Institute of Food Technologists.

School of Business and Technology

BUSINESS AND TECHNOLOGY AWARD: Name of outstanding senior man or woman, as determined by the B&T faculty, inscribed on the School Honor Plaque; choice based on scholarship and leadership.

BUSINESS AND TECHNOLOGY GRADUATE AWARD: Name of outstanding man or woman graduate student, as determined by the B&T faculty, inscribed on the School Honor Plaque; choice based on scholarship and leadership.

OREGON SOCIETY OF CERTIFIED PUBLIC ACCOUNTANTS AWARD: Accounting books valued at $50 awarded to a senior for high academic standards and leadership qualities in accounting.

WALL STREET JOURNAL AWARD: Medallion and subscription to best all-round man or woman graduate in business and technology as determined by the business administration faculty based on scholarship.

School of Education

KAPPA DELTA PI AWARD: awarded to a junior or senior in education who is outstanding scholastically, has great promise as a teacher, and has need for financial assistance.

School of Engineering

AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS HONOR AWARD: Certificate of recognition and key awarded one recipient from the student chapter of ASAE as determined by local selection; name engraved on bronze plaque in Gilmore Hall.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS CERTIFICATE OF MERIT: Certificate of merit and pin awarded to the junior student member of the chapter judged the outstanding student during preceding academic year.

AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS: Local awards of Outstanding Achievement, and Outstanding Lecture certificates. Cash awards and travel allowance for presentation of papers at AIAA Regional Student Branch Conference.

AMERICAN INSTITUTE OF INDUSTRIAL ENGINEERS: Pins awarded and names of the outstanding senior industrial engineer and the student who contributed most to AIIE activities during the year engraved on a plaque.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS AWARDS: Awards of $25, $15, and $10 are given annually for the best papers prepared and delivered in the student branch of the society.

AMERICAN SOCIETY FOR TESTING AND MATERIALS: Certificate of recognition and subscriptions to ASTM publications. One or two awards each year to outstanding upper division students who have shown an interest in the materials field.

ETA KAPPA NU AWARD: Certificate of merit to the outstanding student in the sophomore electrical engineering class; name engraved on a bronze plaque in Dearborn Hall.

GENERAL ENGINEERING SENIOR AWARD: Certificate of merit to the outstanding student in the general engineering senior class; name engraved on plaque in Covell Hall.

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS: Cash awards, certificate, and travel allowance to regional meeting in support of the student papers contest sponsored by the student branch of IEEE.

PI TAU SIGMA AWARD: One handbook presented to the outstanding student in the sophomore mechanical engineering class.

DELROY F. RYNNING AWARD: Initiation fee and half-year's junior membership dues to A.I.Ch.E. to a graduating member of the student chapter judged by his classmates to become most valuable member to the society. A memorial to the late Delroy F. Rynning established by his friends and associates.

SIGMA TAU AWARD: A medal awarded each year to the sophomore student in engineering who as a freshman was the most outstanding student.

School of Forestry

WILLIAM M. ESKEW MEMORIAL AWARD: Dedicated to memory of William Eskew and awarded annually for outstanding performance in Forestry Orientation Day contest competition.

KELLY AXE AWARD: Presented by Kelly Axe Company to the senior in forestry who has contributed most to the success of the School of Forestry.

PACK FORESTRY AWARD: Income from a gift of $2,000 made by Mr. Charles Lathrop Pack of New Jersey awarded annually to the student in forestry who produces the most interesting, logical, and technically significant paper for publication.

XI SIGMA PI PLAQUE: Awarded each year to the student in forestry who has maintained the highest grade average during the sophomore year.

School of Home Economics

DANFORTH AWARDS IN HOME ECONOMICS: Cost of two weeks' leadership training at a Michigan summer camp awarded to an outstanding freshman; provided by Ralston Purina Company of St. Louis, Missouri.

OMICRON NU FRESHMAN AWARD: An award of $10 to promote scholarship and leadership in home economics, the recipient being selected by a committee representing Omicron Nu and the faculty in home economics.

JOHNSON AWARD: $100 annually as a memorial to Miss A. Grace Johnson, professor of household administration 1915-1933, for a home economics junior or sophomore whose grade-point average is above student body average.

LATHROP AWARD: An annual award of $100 by the Oregon Home Economics Extension Council to a junior in home economics in memory of K. Ethel Lathrop.

LEE AWARD: $100 annually as a memorial to Mrs. Minnie E. Lee and Mr. J. B. Lee, awarded each year to a junior in home economics who has shown improvement in her college work, stability and meritorious record in all her activities, and general all-round worthiness.

OMICRON NU ACHIEVEMENT AWARD: Awarded annually to one to four outstanding seniors in home economics. Based on high scholarship, leadership and service in home economics and on all University activities.

OREGON DIETETIC ASSOCIATION ACHIEVEMENT AWARD. An annual award of $100 to a dietetic major entering an approved internship. The recipient is chosen on the basis of ability, professional promise, work experience, and activities.

ELEANOR TRINDLE MEMORIAL AWARD: Two annual awards, $100 each, to juniors in Home Economics; provided by the Oregon Extension Homemaker's Council.

ESTHER KIRMIS AWARD: An annual award of $50 by the Oregon Extension Homemaker's Council in memory of Esther Kirmis to a junior in home economics.

STOKLEY-VAN CAMP, INC. AWARD: A Silver Trivet given to a top-ranking graduating senior in home economics by Stokley-Van Camp, Inc.

See SCHOOL OF PHARMACY for Pharmacy awards.

Student Housing

The Department of Student Housing and Residence Programs, located on the second floor of the Administrative Services Building (AdS B204—754-1771), administers a wide selection of housing alternatives—residence halls, cooperatives, married student housing—all of which offer a wide variety of programs and services. Through the central office, students can make arrangements for accommodations, discuss exceptional situations, consult with educational programs staff, bring suggestions for improvements, work out financial details, and receive assistance on a number of related concerns and interests. Emphasis is upon providing attractive, safe, reasonably priced living accommodations and programs which satisfy residents' desire for both privacy and community, diversity in living arrangements, quality food, and opportunities to integrate residence educational programs with curricular goals of the University.

Housing Policies

The following university regulations pertaining to student housing have been developed in conjunction with the recommendations of the University Housing Committee composed of students, staff, and faculty:

1. Single freshman students who enroll at Oregon State University within one year of high school graduation must live in university residence halls, fraternities, sororities, or cooperatives unless living with parents or guardians. All other students, including those taking from one to seven term hours, may live wherever they choose.

2. University rules concerning student conduct apply to all students wherever they reside.

3. Because of the recognized danger of firearms, they may not be kept in student rooms.

4. HOUSING AGREEMENT: A student may contract for residence hall accommodations for *one term* (sophomores and above) or for the *academic year* (or the remaining portion thereof) as defined in the official University Calendar, and the contract is binding for that period. The payment of the $50 reservation deposit and its acceptance activates the contract. Special contracts may be prepared for students engaged in student teaching, or in other unusual circumstances.

Residence Halls

Living in the halls is viewed as an integral part of the total educational process. It involves the potential for a full measure of interaction and the participation in and coordination of out-of-class living experiences with the on-going formal and informal learning experiences. The direction for providing optional opportunities for the individual in residence halls is generated through the various staff in the Department of Student Housing and Residence Programs.

A variety of choice is reflected among the thirteen residence halls with three for women only, three for men only, and the rest providing accommodations for both men and women. Bloss Hall is reserved for students beyond the freshman year while Snell Hall is reserved for students aged 21 or older. The uniqueness of each hall and its traditions are perpetuated through the returning of students from year to year.

Most student rooms are planned for double occupancy. However, single rooms are available in each hall at special rates. Rooms are furnished with bed, chest, study desk, and chairs. The bed is equipped with mattress cover, one blanket, and pillow. Unless excluded in the residence hall contract information, linen is furnished and is exchanged weekly. Draperies are furnished in all halls except Sackett and Weatherford. Students are responsible for all items furnished and for the upkeep of their own rooms.

For more detailed descriptions of residence halls, see the booklet "Residence Hall Handbook" or the tabloid newspaper "Student Housing."

All students who live in residence halls take their meals in the dining service of their choice. Upon recommendation of the Student Health Service, special diets will be provided at additional cost.

Residence Hall Contract

A residence hall contract is activated with the completion of the appropriate forms, the payment of the $50 reservation deposit, and the acceptance of both the contract and the deposit. The residence hall contract is for a period of *one term* (sophomore and above) or for *one academic year* (or remaining portion thereof) and is binding for that period. Special contracts may be prepared for students engaged in student teaching, or in other unusual circumstances.

The residence hall contract may be canceled only with penalty as noted below:

1. *Prior to September 1*, the contract can be canceled by written notification to the Director of Student Housing. The reservation deposit less a $10 processing fee will be refunded.

2. Between September 1 and the first day of the contract period, or the first day of occupancy should that precede the first day of the contract period, the contract may be canceled by written notification to the Director of Student Housing but with forfeiture of the $50 reservation deposit.

After the contract period begins and if the student is to enroll or continue enrollment in the University, the residence hall contract may be canceled only upon payment of $1 per day for the remaining days of the contract period and with the forfeiture of the $50 reservation deposit.

All contracts are for both room and board. Meal tickets and contracts are not reassignable or transferable.

Students may select the 15-meal plan (3 meals per day Monday-Friday) or the 19-meal plan (3 meals per day Monday-Friday and brunch and buffet service on Saturday, Sundays, and holidays).

Contract Period

The contract period for residence halls begins at 9 a.m. the day before registration Fall Term and 1 p.m. the day before registration Winter and Spring Terms, and ends at 10 p.m. the last day of final examinations each term. Board and room charges do not include meals or housing during the Thanksgiving, Christmas, or Spring vacations.

Meals

Meals are not provided during the Thanksgiving, Christmas, and Spring vacations. The last meals served before closing for vacations are Wednesday lunch before Thanksgiving and Friday lunch of final examination week.

Vacation Accommodations

Room only accommodations will be available for residents in designated halls during Thanksgiving, Christmas, and Spring vacations at an additional charge.

Preschool Accommodations

Students participating in preschool programs may be housed in other than their assigned hall. Those arriving prior to the day the contract period begins will be charged room and board at appropriate rates.

Reserving Residence Hall Accommodations

A student obtains a Residence Hall Contract by coming to or writing to the Department of Student Housing and Residence Programs. Upon its completion, the contract is returned to the OSU Business Office with the $50 reservation deposit. Money orders or checks should be made payable to Oregon State University.

Hall Assignment and Policies

The acceptance of the residence hall contract and reservation deposit does not guarantee preferred assignment nor does it guarantee admission to the University. Assignment is contingent upon the final acceptance for admission by the University and upon available space in residence halls following admission. Assignments are mailed within two weeks prior to the opening of the term.

Requests for assignment to a particular hall will be honored whenever possible. Consideration is given to roommate, preference if both students complete their contracts near the same time and if roommate requests are mutual. *Assignments are made on the basis of the date of deposit receipt.*

Once the assignment has been made, no changes will be considered until after the second full week of classes of the first term the contract is in effect. Freshmen are given preference for assignment between June 1 and July 1. Applications from freshman students received after July 1 will be considered with those from other students and will be assigned by date of deposit.

Returning Student Assignment

Present occupants are given preference for returning to the residence halls until June 1. Those completing residence hall contracts after June 1 will be assigned thereafter on the basis of the date of deposit and the availability of space.

Acceptance

The University reserves the right to refuse any contract for accommodations in the University residence halls by returning the $50 reservation deposit.

Notification of Late Arrival

Hall assignments will be canceled at 9 a.m. on the first day of classes unless the Department of Student Housing and Residence Programs receives notification of late arrival. Reassignment will be made upon arrival.

Reservation Deposit

The $50 reservation deposit must accompany the application. The full $50, less any charges, will be returned to the student after he checks out of the residence hall at the completion of the contract period.

The reservation deposit is forfeited if the contract is not fulfilled, except in the special cases stated in the contract. If the

student contracts to return to the residence halls for the succeeding academic year, the $50 will be retained as a reservation deposit. Charges for damages cannot be made against the reservation deposit during the contract period.

At the time of contract termination, the deposit may be used to pay outstanding hall dues and/or charges for repair or replacement of damaged furniture or fixtures for which the student is responsible. Any balance remaining in the deposit after all charges have been paid will be refunded about six weeks after the close of the contract period.

Payment of Room and Board

Residence hall charges include both room and board and must be paid in advance. If it is not possible to pay the full term charge at the beginning of each term, partial payments may be made according to published schedules and as per billing statements. Charges are due by the 10th of the month, which coincides with the student payroll period. It is the responsibility of the student to pay the posted charges on the due dates. A penalty of $1 per day up to a maximum of $5 is assessed by the Business Office for late payments.

Residence Hall Rates

All Oregon State University residence halls and dining facilities are built and operated entirely with income from resident students. No state tax funds are used.

The State Board of Higher Education reserves the right to make changes in the rates quoted here:

Proposed 1974-75 Room and Board Rates*

Residence Halls	Fall	Winter	Spring	Total
Bloss (phones), double	$476	$357	$357	$1,190
single	620	465	465	1,550
Buxton, Callahan, Poling, Cauthorn—Women (phones), double	456	341	341	1,138
single	588	440	440	1,468
Sackett, double	452	339	339	1,130
single	588	441	441	1,470
Finley, McNary, Wilson, Cauthorn—Men, double	440	330	330	1,100
single	572	429	429	1,430
West, Hawley, without linen, double	435	325	325	1,085
single	567	424	424	1,415
Snell, double	440	330	330	1,100
single	572	429	429	1,430
Weatherford, double	392	294	294	980
single	480	360	360	1,200

**These rates include 19 meals per week. For 15-meal rates, consult Dormitory Office.* Students with one-term contracts should add $50 to the first payment. Rates do not include student government activity fee of $10.

A Social Activity Fee is collected with the first room and board payment each term. The amounts for Fall, Winter, and Spring Terms are $4, $3, $3, respectively.

Telephone Service

Bloss, Buxton, Callahan and Poling Halls and floors occupied by women in Cauthorn Hall have telephones located in each student room. Students are able to dial direct to any on-campus number or any number listed in the Corvallis directory. They may receive direct incoming calls. Only credit card or collect calls may be made from room telephones.

In all other halls, except Hawley, students may obtain a room telephone by paying an additional charge at the Communication Services office after checking into the residence hall.

In halls where room phones are optional, additional phones are located on each floor for student use. Hall telephones may be used only for collect or credit-card long distance calls. Students may not accept incoming calls on these phones or try to place calls from these phones on a prepay basis. Pay station phones are provided for this service.

Housing for Students Over 21

Housing facilities for graduate men and women and other students over 21 years of age are provided in Snell Hall which is located on Jefferson Street across from the Library. The rooms may be rented either as doubles or singles. Graduate students may live in any of the residence halls as space is available.

Summer Term

Residence hall housing is available for summer students. Because of the large number of fall term reservations made by former residents, students entering the University for the first time in the summer may be assigned to one hall for the summer and a different one in the fall.

Off-Campus Housing

Lists of rentals in Corvallis and the surrounding community are posted on bulletin boards adjacent to the Office of Student Services and in the Memorial Union.

University Housing for Married Students

Oregon State University maintains a number of furnished apartments for married students. Rentals range from $97 to $119 per month with water and garbage-disposal service furnished. Apply to the Department of Student Housing and Residence Programs.

Cooperative Housing

The cooperative houses at OSU include those:

Operated by the University: Azalea House, Coed Cottage, and Oxford House for women and Avery Lodge, Dixon Lodge, Heckart Lodge, and Reed Lodge for men.

Operated by Co-Resident Women, Inc. Anderson House, Jameson House, and Jessup House for women.

Independently operated: Beaver Lodge and Varsity House for men.

Each living group has a university-approved Resident Adviser. Each group is governed by a constitution, elected officers, and policies determined by the members. The cooperative houses are united under the Inter-Cooperative Council (ICC).

Students living in cooperative houses save money by each doing three or four hours of housework every week. Additional information and application blanks may be obtained from the Department of Student Housing and Residence Programs or from the individual houses.

Sororities and Fraternities

Among the several types of housing accommodations recognized by Oregon State University are 29 (men's) fraternities and 15 (women's) sororities. Each group is located within a mile radius from the center of campus. Board and room rates approximate those of the residence halls. Membership costs, social fees, and, occasionally, building fund expenses are extra.

Affiliation with fraternities and sororities is by invitation and is based upon mutual choice. "Rush" (the process of member selection) is held by both groups immediately before the beginning of fall term classes and at other times as announced throughout the year.

Freshman women pledges generally cannot expect to be accommodated in the chapter houses. Therefore, they should plan for financial obligations to their sorority in addition to those incurred where they will be residing. Sophomore, junior, or senior women rushing in the fall without previous housing commitments can generally expect to move into the sorority at the time of pledging. Information about sororities and rush is *not* automatically sent to admitted women; however, materials may be obtained by contacting Panhellenic Council, A218, Administrative Services Building, Oregon State University, Corvallis, Oregon 97331.

Sororities at Oregon State University are: Alpha Chi Omega, Alpha Delta Pi, Alpha Gamma Delta, Alpha Omicron Pi, Alpha Phi, Chi Omega, Delta Delta Delta, Delta Gamma, Delta Zeta, Gamma Phi Beta, Kappa Alpha Theta, Kappa Delta, Kappa Kappa Gamma, Pi Beta Phi, Sigma Kappa.

Fraternity pledges can expect to live in the chapter houses provided they haven't made prior, binding contractual agreements to live elsewhere. Materials concerning fraternities and rush are sent to all men admitted to Oregon State University. Specific questions concerning rush registration should be directed to A218, Administrative Services Building, Oregon State University, Corvallis, Oregon 97331.

Fraternities at Oregon State: Acacia, Alpha Gamma Rho, Alpha Kappa Lambda, Alpha Sigma Phi, Alpha Tau Omega, Beta Theta Pi, Chi Phi, Delta Chi, Delta Tau Delta, Delta Upsilon, FarmHouse, Kappa Delta Rho, Kappa Sigma, Lambda Chi Alpha, Phi Delta Theta, Phi Gamma Delta, Phi Kappa Psi, Phi Kappa Sigma, Phi Kappa Tau, Phi Kappa Theta, Pi Kappa Alpha, Pi Kappa Phi, Sigma Alpha Epsilon, Sigma Chi, Sigma Nu, Sigma Phi Epsilon, Sigma Pi, Tau Kappa Epsilon, Theta Chi.

Additional Information

For more detailed information on all types of housing, you may obtain a newspaper entitled "Student Housing" from the Department of Housing.

Counseling Center

Counseling services are available to all students without charge in the Counseling Center, 322 Administrative Services Building.

Counseling. Counselors aid students in making decisions about educational plans, vocational goals, personal concerns, and day-to-day problems. Individual and group counseling is provided concerning social skills, test anxiety, marriage and premarital guidance, and personal adjustment. All counseling is confidential and information is not released unless authorized by the student.

Educational and vocational planning. The Center's library contains occupational information, college and university catalogs, and a career cassette tape from each OSU department. Students may use these facilities in making educational and vocational plans, as well as attend short courses offered each term on academic and vocational goals. Individual and group testing and interpretation are also available. A small fee is charged for testing.

Study Skills. Aid to students deficient in academic skills is provided through mini courses available continuously.

Tutorial assistance from seniors and graduate students may be obtained through the Center.

The University Exploratory Studies Program offers special counseling for undecided students who want help in preparing educational and vocational plans and seeking a suitable major field of study.

Student Health Services

General medical services for all registered students are provided at the Student Health Center. These services are not available to members of the family or faculty. The Health Center contains a pharmacy, physical therapy department, Mental Health Clinic, Gynecology Clinic, and a 42-bed infirmary for students requiring confinement for general medical care or isolation for communicable diseases. Each student who pays student health service fees is provided a maximum of five days of infirmary care per term without charge. The infirmary is closed during the summer term although limited dispensary service is available. Throughout the academic year the dispensary is open from: 8 a.m.-11:50 a.m., Monday-Saturday; and 1 p.m.-4:50 p.m., Monday-Friday. In addition, doctors are on call 24 hours a day seven days a week to provide emergency service at the Health Center. The Health Center is closed during all student recesses.

The Health Center staff includes physicians, registered nurses, pharmacists, a physical therapist, laboratory and x-ray technicians, and special consultants. The Mental Health Clinic, located on the lower level of the Health Center, is staffed by psychologists, a psychiatric social worker, and psychiatric consultants. All medical records are confidential and are not released unless authorized by the patient.

Extra charges are made to cover costs of such items as overtime in the infirmary, special medications, x-rays, and laboratory tests. All expenses connected with surgical operations, fractures, specialized medical care, and special nursing must be met by the student who requires such attention. The Health Center will not pay or be responsible for bills from private physicians or private hospitals.

Medical History Requirement

A medical examination is not required of entering students. However, a medical history summary is required, and it is recommended that a tuberculin test (or chest x-ray) have been performed within the past year. Also recommended are diptheria-tetanus and poliomyelitis immunizations. Special considerations are recognized for students who decline immunization because of religious convictions. The tuberculin test (or chest x-ray) is mandatory for all foreign-born students.

Foreign students are required to purchase approved medical insurance before registering for classes.

Inquiries regarding any health requirements should be made to the Student Health Center.

Student Accident and Sickness Insurance

The ASOSU Insurance Plan (Students' and Dependents' Accident and Sickness Medical Expense Plan) is offered to students at registration or afterward at the Memorial Union Business Office until the final day of registration. Costs per student are $16.70 each term and $50.35 for the year. Coverage for dependents is additional. If three terms of coverage are purchased at fall registration, summer coverage is included. This plan will cover all insured students 24 hours a day, anywhere in the world, including vacations. The policy provides added benefits for diagnostic x-ray and laboratory fees for illness on an out-patient basis. The policy will pay up to $1,000 for accidents, illness, and dismemberment. Also available is a separate Voluntary Accidental Death and Dismemberment Plan which pays $10,000 on accidental death or double dismemberment. Cost is $12 per year.

Activities which include athletic events such as the Recreational Sports Program and which are registered at the Student Activities Center must include accident insurance coverage for participants in the form of student insurance, personal policies, or day-coverage policies for the event. Information regarding insurance may be obtained at the Activities Center.

Memorial Union

The Memorial Union, located in the heart of the campus, is a community center for Oregon State University. It provides services, facilities, and programs to meet the varied social, recreational, and cultural needs of Oregon State University students, faculty, staff, alumni, and campus guests.

The building contains an activity center for the use of all student organizations. It provides a complete food service in-

cluding cafeteria, snack bars and banquet facilities, a book store, recreation area including billiards, bowling, and table tennis facilities, a music room, ballroom, art gallery, craft shop, lounges, and meeting rooms of all types.

The president of the Memorial Union is a student; other students share actively in its management and in organizing the social, recreational, and cultural programs.

The building stands as a constant reminder of this nation's struggle for peace, and a living memorial to the students who have given their lives in the service of their country.

Educational Activities

Oregon State University recognizes the value of student activities as a part of a college education. It is through the activities program that students are stimulated to discover and experiment with their own capabilities and capacities, and to be creative in their approach to problem solving. Leadership experience gained through participation in self-governing organizations and programs encourages the formation of habits of civic responsibility. Activities enhance social, recreational, and cultural development by fostering participation in the social, intellectual, and aesthetic life of the campus. Because of their close relationship to the educational program, many activities are cocurricular rather than extracurricular. Whether planning programs or attending them, it is fun, a good way to meet others, and a sure way to feel more a part of the University.

Student Government

The Associated Students of Oregon State University (ASOSU) is the student government on the OSU campus. In recent years ASOSU has become increasingly active in the policy making and operation of the university through student participation on some 75 university committees.

Class Organizations formed by each entering class retain their identity throughout the four undergraduate years.

Councils representing both men's and women's living groups have important roles in student self-government. They include Panhellenic Council, Residence Hall Council, Interfraternity Council, and the InterCooperative Council.

Other Activities

Art and Music. Exhibits, lectures, concerts, and recitals sponsored by the Art and Music departments, the Associated Students, and student musical and art organizations play a central part in the cultural life of the community. Under the patronage of the Memorial Union Program Council and the Art Department, exhibitions in the Memorial Union stimulate interest in architecture, painting, sculpture, and related arts. They give the student acquaintance with his cultural heritage and an awareness of contemporary art movements throughout the world. Student and faculty art exhibits are shown in the Fairbanks Hall galleries throughout the year.

Membership in the student musical organizations is open to all students after consultation with the directors concerned.

OSU groups are members of the American Symphony Orchestra League and the American Choral Foundation. Students in these activities earn regular credit.

The Corvallis-OSU Symphony, the Concert Band, the University Chorus, Madrigal, and the Choralaires present several concerts annually on the campus.

The Corvallis and OSU Music Association brings artists of international fame to the campus for concerts and recitals. Advanced music students and faculty also give public recitals during the year. Several dance recitals are given each year under the auspices of the Division of Physical Education, and other organizations. The all-student Encore Committee brings to the campus popular entertainment in the form of pops concerts and entertainment.

Forensics, Dramatics, and Radio and Television. Speech activities have intellectual and cultural value for both the participants and the campus community. Oregon State is a member of the Pacific Forensic League, the Intercollegiate Forensic Association of Oregon, and Model United Nations. Special student organizations, such as Masque and Dagger, KBVR, the Campus Puppeteers, and chapters of Delta Sigma Rho-Tau Kappa Alpha, Zeta Phi Eta, and National Collegiate Players also provide outlets for forensic, dramatic, and broadcasting talent.

Training and experience in acting, play production, and stagecraft are provided by the Speech Communication Department. Each season, seven major plays and groups of one-act plays are presented in Mitchell Playhouse in connection with course work. The well-equipped radio and television studios in Shepard Hall afford practical training in the mass media of communication. Music, information, news, and sports are programmed over KBVR; television programs are prepared and telecast over a closed-circuit system. A full schedule of forensic activities for both men and women students, including debate, oratory, extempore speaking, after-dinner speaking, and discussion, are under the direction of the Speech Communication Department. Each year, thirty to forty students compete in eight state intercollegiate speaking contests and at least a half dozen regional and national forensic tournaments. Many additional students are also given an opportunity to speak or read before service clubs, lodges, granges, and other groups. For participation in these activities, a student may earn regular credit.

Lectures. Frequent public lectures by faculty members and visiting scholars and persons prominent in national affairs supplement the regular curriculum. Campus sponsors of lectures include the Committee on Convocations and Lectures, American Association of University Women, Faculty Women's Club, College Folk Club, Liberal Arts Programs, Committee on Religious Education, Round Table, Associated Students, Sigma Xi, and others.

Athletics. As a member of the Athletic Association of Western Universities (AAWU), Oregon State University conducts a regular program of competition with other large Pacific Coast universities in football, basketball, baseball, track, crew, wrestling, swimming, tennis, and golf.

Physical Recreation. Student fee funded Physical Recreation programs and facilities at Oregon State University are coordinated and administered by the Board of Physical Recreation.

The Department of Educational Activities and Physical Recreation, the Division of Health and Physical Education, and the Department of Intercollegiate Athletics administer the following facilities available for physical recreation activities.

Educational Activities and Physical Recreation

Outdoor Recreation Center
McAlexander Fieldhouse
University Handball Courts
Dixon Recreation Center (Completion late Dec. 1974)
Outdoor Program Center

Division of Health and Physical Education

Langton Hall
Women's Gym
Intramural Track
Intramural Playing Fields
University Tennis Courts
Golf Practice Areas

Intercollegiate Athletics

Parker Stadium Astro Turf

Physical Recreation program opportunities at Oregon State University include:

Recreational Club Sports—offering intercollegiate competition for men in bowling, lightweight crew, rugby, volleyball, water

polo; for women in bowling and crew; and coed sports including: fencing, judo, pistol, rifle, rodeo, skiing, table tennis.

Outdoor Program—offering opportunities for back packing, camping, climbing, rock hunting, canoeing, rafting.

Intramural Activities—The office of Intramural Sports provides students. A variety of organized and spontaneous physical recreation programs. Students may select from over thirty individual sports (badminton, tennis, judo, handball, archery) or team sports (flag football, basketball, volleyball, softball, water polo, soccer, swimming). Also co-recreational volleyball, softball, swimming, badminton, and tennis opportunities are available.

Student Publications. Student publications include the following: *The Oregon State Daily Barometer* (five days a week); *The Beaver* (yearbook issued in May); *Student Handbook; The Oregon State Student Directory* (published fall term); and *Prism* (literary magazine published once each term).

Eligibility

To be eligible to hold office in any extracurricular or cocurricular activity officially recognized by OSU a student must: (1) Have earned at least 12 hours of credit in his most recently completed term at OSU. (2) Be registered for at least 12 hours currently at OSU. (3) Have an accumulative GPA of 2.00 or higher. (4) Not be on disciplinary probation.

All-University Programs and Organizations

University Honors Program

Director: LEONARD J. WEBER, M.S.

The University Honors Program provides enriched educational opportunities to students of superior scholastic ability. All of the facilities of the university are available to provide a wide variety of intellectual experiences. Flexibility is stressed in an effort to tailor the education to the needs of the individual.

Honors work began at Oregon State in the School of Science in 1959. A combined program between that school and the School of Humanities and Social Sciences was initiated in 1964 and led to the establishment of the present program on a university-wide basis. All students, regardless of their school or departmental affiliations, participate in freshman and sophomore honors colloquia, attend special lectures, take recommended basic courses outside their area of specialization, and participate in senior honors seminars. This portion of the program is designed to provide breadth.

At the beginning of the junior year, the student begins departmental honors work. The nature and extent of this work is determined by the department and is adapted to the specific field. Normally, this work includes special seminars and courses, guided reading programs, independent study and research. The latter frequently culminates in a senior thesis presented to the departmental faculty. Specific details may be obtained from the departments. The various schools on campus may provide additional lectures or seminars to augment the general and departmental programs.

Admission is based on evidence of high scholastic performance in high school, recommendations from the high school faculty, and suitable scores on the College Entrance Examination Board Tests including the Scholastic Aptitude Test. The Honors Committee will exercise discretionary powers in judging individual applications. No application can be acted upon by the Committee until the results of these tests are available.

Application. Students interested in the program are invited to apply. Application forms may be obtained from the Director of the University Honors Program, Bexell Hall, as soon as the student has been accepted for admission to Oregon State. Thereafter, any qualified student may make application through the first term of the junior year. Transfer students also may apply. Students are urged to submit their applications prior to September 1.

Requirements. For satisfactory completion of the University Honors Program a student is expected to fulfill the following requirements:

1. Enrollment during the freshman and sophomore years in the Honors Colloquia sequences: these sequences are UH 111, UH 112, UH 113, UH 214, UH 215, UH 216.
2. Maintain a minimum grade-point average of 3.00. Some departmental requirements are higher for work in major fields.
3. Enrollment in recommended basic courses in fields outside the area of concentration and/or interdisciplinary Junior-Senior Honors Seminars. The number and nature of these courses and seminars will be determined on an individual basis.
4. Satisfy all school and departmental honors requirements during the junior and senior years. The nature of these requirements will depend on the school and department involved. The honors student will normally be required to complete a senior thesis or project with the equivalent of at least 6 term hours.

Honors Courses

UH 407. **Honors Seminar.** Terms and hours to be arranged.
Reserved for students in the University Honors Program.

UH 111,112,113. **Honors Colloquia.** 1 hour each term. 1 ①
Reading and discussion groups organized on a modified tutorial basis. Reserved for students in the University Honors Program.

UH 214,215,216. **Honors Colloquia.** 1 hour each term. 1 ①
Reading and discussion groups organized on a modified tutorial basis. Reserved for students in the University Honors Program.

Withdrawal. A candidate for the University Honors Program may withdraw or be dropped from the program without prejudice when the Honors Committee deems such action to be in the best interests of the student, the program, the department, and the school. Petition for re-admission may be made to the Honors Committee at any time.

Educational Opportunities Program

Acting Director; DAVID B. VALENCIA

Oregon State University's Educational Opportunities Program (EOP) is designed to provide special assistance to a selected number of Black Americans, Mexican-Americans, American Indians, and certain White Americans who may or may not meet regular university admission requirements but are recognized as having the potential to complete successfully a college degree program. In order to equalize and enhance the chances of success for these students, the university adjusts certain of its institutional policies and procedures and augments the services it extends to regular students to assist them in overcoming their initial handicaps.

Prospective applicants for admission to the Educational Opportunities Program are informed as fully as possible of the kinds of assistance that would be available to them, including the extent of available financial aid, tutoring, counseling, and academic advising. At the time of official acceptance by the university, the full scope of the applicant's opportunities and responsibilities is further clarified to prevent misunderstanding and to provide the students with as much initial self-assurance as possible.

After official admission, the particular needs of the individual student are identified by means of tests developed by the university's Counseling Center and from information obtained from individual consultation with the student. An individualized schedule of tutoring, counseling, and academic advising is worked out with the student which will determine the nature of the student's participation in the EOP. The planned schedule is subject to continual re-examinaton and may be reformulated at any time by the student in consultation with his counselor.

Students who believe they qualify for admission to EOP and are interested in attending OSU should write to the Office of Educational Opportunities, Waldo Hall 324, Oregon State University 97331.

Summer Term

Director: ROBERT L. PHILLIPS, Ph.D.

Assistant to the Director: ANITA F. WHITTLE

The summer term at Oregon State University is designed for maximum flexibility.

Some students continue their studies during the summer in order to graduate sooner. Other students use the summer to complete graduate degrees and/or to complete requirements for certification. Still others use the summer to prove they can do satisfactory college work and thereby qualify for admission. For these students and others, Oregon State University is a scholarly and friendly place for summer study in many fields.

Summer courses. Most of the academic work in summer is scheduled in the eight-week term. An eleven-week program is reserved primarily for courses in sequence which permit a student to complete a two-term or three-term sequence in a subject in the eight- or eleven-week period. Several workshops are offered, ranging from one to six weeks each. See page 2 for Summer Term dates.

Most summer courses are offered in Education, Liberal Arts, Business and Technology, Science, and Home Economics, although some courses are available in every school within the University.

Credits, fees, and housing. The student enrolled in the eight-week term may earn up to 12 hours of credit, or more with the approval of one's dean. The student enrolled in the eleven-week term may take one complete sequence plus 6 hours of credit, making a total of 15-18 hours in the eleven-week period.

The fee for summer term is the same for residents and nonresidents. See the Summer Term Bulletin for tuition and housing fees. Plenty of housing is available in the summertime. Information and application forms may be obtained by writing to the Department of Housing. The Summer Term Bulletin and other special announcements may be obtained by writing the Director of Summer Term, Oregon State University 97331.

International Education

Director: GORDON R. SITTON, Ph.D.
Foreign Student Adviser: MARVIN L. DURHAM, Ph.D.
Asst. Foreign Student Adviser and Foreign Study Adviser: LAURA L. MORGAN, M.Ed.

To promote policies, programs, and activities that will contribute to a broader understanding among nations and peoples, the University combines on-campus activities with programs of study, research, teaching, and technical assistance in many areas of the world.

The Foreign Study Adviser and the Director of International Education advise students and faculty who wish to participate in the study abroad programs of the University and assist in developing opportunities for travel and work abroad.

The Foreign Student adviser assists students from abroad in their personal, social, and academic adjustment to American university life. Additional assistance is given in connection with visas and finances. The adviser helps to promote educational and social experiences between foreign students and American student groups, faculty, and community.

Foreign Study Programs

The Oregon State System of Higher Education sponsors overseas study centers in France, Germany, Italy, and Japan. The study centers—each with a different type of program—are designed to enable qualified students to earn three terms of academic credit from Oregon State University while pursuing their studies abroad.

Oregon Study Center in France

University of Poitiers, France
Resident Director: LOUIS A. OLIVIER, M.A. (UO)

The French Study Center permits students from a wide range of disciplines to study for two semesters as students in the University of Poitiers, concurrently with enrollment at Oregon State University. All applicants must have completed one year of college undergraduate work but preference will be given to applicants who have the equivalent of at least two years of college French prior to arrival at the Center. Participants will be enrolled for a four-week language and orientation course in Poitiers immediately before the beginning of the school year. To be accepted, students must be qualified to participate fully in the academic, cultural, and social life of the University of Poitiers.

Oregon Study Center in Germany

University of Stuttgart, Germany
Resident Director: WALTER C. KRAFT, Ph.D. (OSU)

The German Study Center makes it possible for students from a wide range of disciplines to pursue their studies for two semesters at the University of Stuttgart, the University of Tubingen, or one of the other institutions of higher education in or near Stuttgart. All applicants must have upper division standing and must have had the equivalent of two years of college German to be eligible. Participants will be enrolled for a four-week language refresher course in Stuttgart immediately before the beginning of the school year. It is expected that students will be qualified to participate fully in the academic, cultural, and social life of the German university to which they are assigned.

Oregon Study Center in Japan

Waseda University, Tokyo
Resident Director: STEPHEN W. KOHL, Ph.D. (UO)

The Japan Study Program provides an opportunity for students to undertake significant academic study for one year in the history, culture, and current social and economic conditions of Japan and other parts of Asia. Except for language classes, instruction is in English. Students are permitted opportunity for travel throughout Japan and other countries. Students live with Japanese families. Japanese language is desirable but not a prerequisite.

Other Study Abroad Programs

Other institutions in the Oregon State System of Higher Education administer study centers in Italy, The Netherlands, and Hungary. Information on these, on summer programs of OSU, and on programs of other schools is made available through the Foreign Study Adviser.

Liberal Arts Study Program

Oregon State University as a member of the Northwest Inter-Institutional Council on Study Abroad offers: LIBERAL ARTS STUDY PROGRAMS in England and France for OSU credit.

Fall, Winter, Spring: London. Courses are offered in Art, History, Modern Drama, Music, Shakespeare, Political and Social Institutions, Theater, and Independent Study. Students may enroll for one or more terms, and will live with English families. Faculty will be drawn from Northwest universities and colleges. Maximum use will be made of theaters and other opportunities. Students may enroll for one or more quarters.

Fall, Winter, Spring: Avignon. Courses are offered in Art, Language, Drama, History, Literature, Political Science, and Independent Study in both French and English. Students may enroll for one or more quarters.

Peace Corps

To provide opportunities for volunteer service throughout the world, the University provides assistance to students and to the Peace Corps in order to assure the maximum consideration of skills, training, and perferences in the placement of applicants.

Additional information may be obtained from the Office of International Education, Administrative Services Building A 100.

Instructional Resources and Materials

The purpose of IRAM is to provide resident faculty with instructional media support to improve classroom instruction. The system includes six basic services: (a) classroom a-v equipment: scheduling, delivery, and operation; (b) departmental a-v equipment maintenance and repair service: departments pay for all parts and projection lamps (when a-v equipment is used for laboratory purposes, such as self-learning centers, a labor charge may also be assessed); (c) classroom instructional media materials production: art, graphic arts, transparencies, and photography; (d) University Learning Laboratory (language lab): faculty and student area for audio and video taped lesson study; (e) film rental service: scheduling, delivery to classroom, set up, show, and return of film (instructional department must pay all film rental fees); (f) consultation service: preparation of course objectives for appropriate instructional materials, a-v equipment orders, classroom and building design, and instructional research proposal design.

Departments may obtain from IRAM many of the common a-v materials such as audio-tape, projection lamps, and transparency materials, but must pay the acquisition costs including handling charges. Except as noted, or when costs are extensive, the services listed are provided at no charge to the individual department.

IRAM is also responsible for university services not directly related to direct resident instruction. These are: the Photographic Service, Weniger Hall 304; the University Graphic Arts Service, Kidder Hall 109; the Educational Media Center on the ground floor of Education Hall; and the nonclassroom use of the Home Economics, Withycombe, and Earth Science Auditoriums. The user must pay for these services, and price lists and/ or cost estimates are available at the unit or from IRAM, Dr. Ben Purvis, Director, Kidder Hall 109, extension 2121.

Center for Self-Instruction

The Center for Self-Instruction is available to students of the University who wish to undertake self-initiated independent study projects. The Center includes an extensive library of self-instructional materials of various types such as films, tapes, slides, and programmed instructional material in a wide range of subjects. It is on the ground floor of Education Hall.

Division of Continuing Education

R. DUANE ANDREWS, Ph.D., Director

ROBERT A. NICHOLAS, Ed.D., Associate Director

PAUL A. WURM, Ph.D., Registrar and Assistant Director for Student Services

The Oregon Division of Continuing Education, a unit of the State System of Higher Education, administers a diversified program of adult education and service in off-campus locations throughout the state.

As an agency of the Chancellor's office, it conducts credit courses, seminars, workshops, institutes, and other educational activities extended from the state colleges and universities. Qualified adults may arrange with institutions to work toward degrees in these classes, most of which are held evenings, weekends, and other convenient times. Independent study is possible through correspondence courses, televised instruction, and packaged instructional programs at both the college and high school credit levels.

Noncredit courses are offered in fields relating to business and industry, health sciences, social welfare, emergency preparedness, communications, science, engineering and technology, liberal arts, and contemporary problems. Some programs are conducted in cooperation with community, professional, and volunteer groups.

Educational services provided by the Division include a film and audiotape lending library, an instructional materials development center, and continuing education publications.

Offices are located in Ashland, Astoria, Coos Bay, Corvallis, Eugene, LaGrande, Portland, and Salem.

Extension Service

The Oregon State University Extension Service provides informal, non-credit education to adults and young people in Oregon. Its mission is to deliver the best informal educational programs that are responsive to people's needs—in agriculture, family living, forestry, marine resources, community development, and 4-H youth activities. In fulfilling its mission, Extension relies on resources of the University. For additional information about the OSU Extension Service, see page 100.

Parent and Alumni Organizations

Dads Club

The Dads Club, composed of fathers and male guardians of Oregon State University students, was founded on the premise that no persons have greater or more legitimate interest in promoting the welfare of Oregon State than do the fathers of its students. The Club, through its annual dues program, awards full tuition and fees scholarships to worthy students, helps underwrite a campus-wide tutorial program, contributes to the university loan fund, and awards annually certificates of merit to outstanding high school seniors. The Board of Directors meets monthly, September through June. Dads Weekend is an annual winter term campus event.

Mothers Club

The Mothers Club of Oregon State University is open to all mothers and other women interested in furthering the interest and welfare of students of Oregon State. Individual units of the Mothers Club are organized in many communities of the State. Annual meetings of the State organization are held on campus Mothers Weekend. The Mothers Club awards full tuition scholarships to deserving students.

Alumni Association

Attendance at Oregon State makes one eligible for membership in the Oregon State University Alumni Association which provides informed, organized alumni backing of Oregon State projects. The Association publishes the *Oregon Stater*, a seven-times-a-year tabloid newspaper, which is distributed to all alumni and parents of undergraduates. All contributions to the Oregon State Fund accumulate toward a $100 life membership and are considered for allocation to the various categories of need by the Alumni Board of Directors.

Officers and directors of the association are elected annually at one of three business meetings held during fall, winter, and spring terms. Directors serve for a three-year period. Officers and directors are:

Executive Committee:

EUGENE H. SCHAUDT, '50, President, Eugene
MRS. JOHN H. HANN, '42, First Vice-President, Salem
R. STEVENS GILLEY, '56, Second Vice-President, Portland
RICHARD G. FARNES, '54, Portland
MRS. JOHN B. FENNER, '39, Corvallis
ROBERT W. JACOBSON, '63, Newport
RICHARD J. NELSON, '51, Beaverton
KEN PLACE, '60, Corvallis
E. B. LEMON, '11, Corvallis
NORMAN G. THIEL, '57, Corvallis

Board of Directors:

CLEORA ADAMS, '76, Corvallis
JOHN H. BERGEN, '36, Coos Bay
G. M. "JUD" BLAKELY, '65, Portland
MRS. ROBERT T. BRAGG, '53, Mercer Is., Wash.
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Oregon State University Federation

The Oregon State University Federation, organized in 1951, includes representatives of the Associated Students, the University administration, the Mothers Club, the Dads Club, and the Alumni Association. Its purpose is to coordinate, implement, and encourage activities of the various member groups in behalf of Oregon State and its students. Officers are URSEL C. NARVER, Portland, Chairman, and MRS. JOHN WIEMAN, Portland, Secretary.

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The object of the Oregon State University Foundation, as stated in its articles of incorporation, is to aid and promote educational and charitable activities and purposes, and specifically, to solicit, acquire, receive, hold, manage, construct, use, maintain, lease, exchange, and dispose of all kinds of property, whether acquired absolutely or in trust, for the benefit of OSU. Substantial gifts have been received and, since its incorporation in 1947, the Foundation has become an important adjunct to the advancement of Oregon State.

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LIBERAL ARTS

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As of January 1974

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HORTON L. FROSS, Ph.D., Director of Advising and Student Services

JAMES J. O'CONNOR, Ed.D., Assistant Professor of Social Science Education

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THE COLLEGE OF LIBERAL ARTS (formerly known as the School of Humanities and Social Sciences) offers major programs in the humanities, the social sciences, and the arts.

The *humanities* include fields of knowledge and experience having to do with the productions of man as a feeling, thinking communicator—English, journalism, history, modern languages, philosophy, religious studies, and speech communication.

The *social sciences* include those fields of knowledge having to do with human institutions, customs, and behavior—anthropology, economics, history, geography, political science, psychology, and sociology.

The *arts* help establish the basis for lifelong creative expressiveness in various art forms including music, the theater, art, architecture, and landscape architecture.

The College of Liberal Arts offers major programs leading to the Bachelor of Arts (B.A.) or Bachelor of Science (B.S.) degree in the following:

American Studies	Liberal Studies	Religious Studies*
Anthropology	Modern Languages*	Russian Studies
Art	Music	Sociology
Economics	Philosophy	Speech
English*	Political Science	Communication
Geography	Psychology	Technical Journalism
History		

* *B.A. only.*

The College of Liberal Arts also offers many courses in the arts, humanities, and social sciences which are of value to all students and which are basic to a liberal education. Such courses help the individual student in his personal development and enrichment through a deeper understanding of himself and appreciation of man's cultural development.

Requirements

In addition to fulfilling university requirements (page 14), the candidate for a baccalaureate degree must complete the following College of Liberal Arts requirements:

A. Distribution Requirements

1. A sequence in a laboratory science.
2. A sequence in a social science.
3. A sequence in an additional science or social science from departments not used to satisfy requirement 1 or 2.
4. Two sequences in the humanities (including history) from different departments.
5. A sequence in the arts.
6. A second-year modern language or a sequence in a non-European culture (African, Asian, Russian, Latin American).
7. Demonstrated mathematical proficiency at the Mth 101 or Mth 161 level.

To satisfy requirements 1-6, sequences may be selected either from courses in a single discipline or in related disciplines. Sequences selected must consist of a series of closely related courses with an integrated theme or focus extending through more than one term. An advisory list of sequences is available from the academic adviser or the Director of Advising and Student Services, College of Liberal Arts. Sequences not on the advisory list must be approved by the academic adviser and by the Dean of the College of Liberal Arts.

B. Concentration requirements

A maximum of 60 term hours may be included in either departmental or interdepartmental majors.

Course work in a department in excess of that required for the departmental major may not be applied to the distribution requirements listed above.

For specific requirements in each major see listings below.

C. Electives

At least 27 hours of elective courses are required for graduation. At least half of the elective hours in a departmental major must be in courses outside of that department.

Co-Majors in Officer Education

Under the principles establishing Officer Education (ROTC) at Oregon State University, it is stipulated that the prescribed program in aerospace studies, military science, or naval science may be taken as a co-major in any school (see DEGREES AND CERTIFICATES).

Teacher Certification

Basic and Standard Norm programs are offered in art, literature, writing, and language; social studies; language arts-social studies. Basic Norm programs are authorized in French, German, Spanish, Russian, speech and drama, speech correction, journalism, and music.

Students interested in qualifying for a State Teacher's Certificate should consult their advisers or the Director of Advising of the College of Liberal Arts.

University Honors Program

The Honors Program provides opportunity for individual enrichment and achievement. For information regarding eligibility, application forms, organization of the program, and advisers see UNIVERSITY HONORS PROGRAM elsewhere in this catalog.

Programs and Courses in the Liberal Arts

AMERICAN STUDIES

The inderdisciplinary major in American studies is intended for students with an interest in American society, culture, and institutions. Requirements are flexible to permit individual programs suited to student interests and goals. The major provides a foundation for professional and post-graduate study and for a variety of careers in business and government.

Candidates for the B.A. or B.S. degree must complete the following:

1. University requirements for graduation (see page 14).
2. College of Liberal Arts distribution requirements (see above).
3. A minimum of 51 hours of approved courses including (a) AmS 307; (b) a year's sequence in U.S. history; (c) a year's sequence in American literature, and (d) a minimum of 24 upper division hours from at least *three* departments in courses pertinent to a study of American social, cultural, political, or economic development.

Lower Division Courses

AmS 307 Seminar
Terms and hours to be arranged
Integrates American ideas, values, and institutions. Required of and restricted to sophomore or junior American studies majors. May be repeated to a maximum of six hours of credit.

AmS 405 Reading and Conference
(g) Terms and hours to be arranged

ANTHROPOLOGY

The Department of Anthropology offers B.A. and B.S. degree programs. Courses meet the needs of (a) students majoring in anthropology and (b) those choosing such courses as a part of other degree programs or desiring a comprehensive understanding of human societies and their cultures.

In addition to university and school requirements, students majoring in anthropology must complete the following courses: Anth 105,106/304,305,306/320, 321,322 / 430,431,432 / 490,491,492 and an approved topical course.

Lower Division Courses

Anth 105,106 General Anthropology
3 or 5 hours each term 3 ① 5 ①
Anth 105: paleoanthropology, the evolution of man and his culture. *Anth 106:* introduction to cultural and social anthropology.

Anth 107 Anthropology Today
3 hours 3 ①
Contemporary human issues from an anthropological perspective with anthropological subdisciplines applied to problem solving in modern society.

Anth 199 Special Studies
Terms and hours to be arranged

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Anth 304,305,306
Socio-cultural Anthropology
3 hours each term 3 ①
Social relationships and cultural patterns in selected areas of the world. Kinship, families, age and sex groups as bases of social organization; comparison of social organizations of selected settings; analysis of social systems. Taken in sequence. Prerequisite: Anth 106 or equivalent.

Anth 314,315,316 Peoples of the World
3 hours each term 3 ①
Historical treatment and development of world cultural areas. Significance of regional variations in culture in contemporary world affairs. *Anth 314:* The Americas. *Anth 315:* Oceania. *Anth 316:* Africa.

Anth 320,321,322
Physical Anthropology
3 hours each term 3 ①
Human and primate evolution, processes of raciation. *Anth 320:* man as a primate, fossil man, human evolution. *Anth 321:* morphology and genetics, raciation and human races. *Anth 322:* primate behavior, introduction to applied physical anthropology. Taken in any sequence. Prerequisite: Anth 105 or equivalent in biological science.

Anth 323,324,325
Physical Anthropology Laboratory
1 hour each term 1 ②
Lecture and laboratory exercises in osteology, anthropometry, anatomy, and serology in human and nonhuman primates. To accompany Anth 320,321,322.

Anth 401 Research (g)

Anth 402 Independent Study

Anth 403 Thesis

***Anth 405 Reading and Conference (g)**
Terms and hours to be arranged

* Graduate credit for Anth 405 and Anth 407 must not total more than 9 hours.

Anth 406 Projects (g)

***Anth 407 Seminar (g)**

Anth 408 Workshop
Terms and hours to be arranged

Anth 411,412,413
Anthropology of North America (g)
3 hours each term 3 ①
Anth 411: peoples and cultures before European contact. *Anth 412:* the European colonial period and the consequences for aboriginal cultures. *Anth 413:* the effects of industrialization. Prerequisite: 9 hours of anthropology. Offered alternate years.

Anth 414,415,416
Anthropology of Latin America (g)
3 hours each term 3 ①
Anth 414: Pre-Columbian. *Anth 415:* Post-Columbian culture, culture contacts, and consequences for aboriginal cultures. *Anth 416:* Modern Latin America and the effects of industrialization. Prerequisite: 9 hours of anthropology. Offered alternate years.

Anth 417,418,419 Anthropology of South and East Asia (g)
3 hours each term 3 ①
Cultures, historical and regional variations, and continuity in South and East Asia. *Anth 417:* India and South Asia. *Anth 418:* China. *Anth 419:* Southeast Asia. Prerequisite: 9 hours of anthropology. Offered alternate years.

Anth 420,421,422
Anthropology of Oceania (g)
3 hours each term 3 ①
Cultures of Oceania, Australia, and Indonesia. *Anth 420:* Indonesia. *Anth 421:* Australia and Melanesia. *Anth 422:* Polynesia. Prerequisite: 9 hours of anthropology. Offered alternate years.

Anth 423,424,425
Anthropology of Africa (g)
3 hours each term 3 ①
Cultures of Sub-Saharan Africa, problems and solutions posed in Africa's quest of modernization. Prerequisite: 9 hours of anthropology. Offered alternate years.

Anth 430,431,432 Archaeology (g)
3 hours each term 3 ①
Method and theory in American archaeology, development of Old and New World civilizations from their paleolithic bases, significance of archaeology to the analysis of human culture. Taken in sequence. Prerequisite: 9 hours of anthropology.

Anth 434 Field Archaeology (g)
1 to 10 hours
Lectures, demonstrations, and field exercises in archaeology field methods and techniques. Equipment and supplies, field camp management, site surveying and mapping, site excavation, keeping records, field cataloging, writing site reports. Prerequisite: 9 hours of anthropology.

Anth 460,461,462
Anthropology of Afro-America (g)
3 hours each term 3 ①
Anth 460: Historical and cultural backgrounds of Afro-American culture. *Anth 461:* Adaptations and acculturation of Afro-Americans in the New World. *Anth 462:* Contemporary relations in Afro-American cultures. Offered alternate years.

Anth 470,471,472
Selected Topics in Anthropology (g)
3 hours each term 3 ①
Recent advances in anthropology and their application to special fields of study. Topics vary from term to term but may include urban anthropology, culture change, culture and the individual, the philosophical bases of anthropological thought, cultural foundations of education, man in the marine environment, mythology, folklore, and applied anthropology. May be taken out of sequence. Prerequisite: 9 hours of anthropology.

Anth 490,491,492
Anthropological Linguistics (g)
3 hours each term 3 ①
Language as an aspect of human behavior and culture: Phonological analysis, grammatical analysis, comparative linguistics, socio-linguistics; cognitive anthropology. Prerequisite: 9 hours of anthropology.

ARCHITECTURE AND LANDSCAPE ARCHITECTURE

The Department of Architecture and Landscape Architecture offers programs under Liberal Studies (see page 44). Selected courses from this department may form one of the fields of concentration leading to a B.A. or B.S. degree.

The departmental courses prepare a student for advanced study in his specialized professional area, and provide background for work with established environmental organizations or in allied fields relating to architecture and landscape architecture. Students majoring in other departments may take a minor in this department.

Field trips are scheduled for some courses and one major field trip is required before work may be taken at the senior level.

COURSES IN ARCHITECTURE

Lower Division Courses

ALA 10,11,12 Design Orientation
No credit
Theory and practice of planning and design. Intended to acquaint the student with the scope and nature of the design professions. Required for majors in archecture, landscape architecture, and interior architecture. Normally taken concurrently with ALA 287.

ALA 111,112 Graphics
3 hours each term 3 ②
Light, color, and space in typical architectural forms, media, and methods; manipulation of instruments; freehand perspective, shades, shadows; projection, sectioning.

ALA 121 Construction Materials
2 hours 2 ①
Materials and techniques of constructing buildings and furnishings; framing, fabrication, enveloping, surfacing, and finishing: color, scale, texture—techniques for use. Manufacture, distribution, availability, maintenance, and depreciation. Field trips, demonstrations, illustrated lectures, and laboratory investigation.

ALA 178
Housing and Architectural Philosophy
3 hours any term 2 ① 1 ③
Domestic architecture. Small-house planning and graphic communication with reference to the needs of students in agriculture, business and technology, education, engineering, forestry, and home economics.

ALA 179,180 House Planning and Architectural Drawing
3 hours each term 1 ① 2 ③
Small-house construction; detail drawing; development of working drawings begun in ALA 178; presentation plans, advanced planning and design.

ALA 187 Design Studio I
3 hours each term, three terms 3 ②
Projects and exercises in fundamental form and space concepts. Control of proportion, scale, and design relationships; developing habits of problem formulation and sound bases for value judgments. Release of student's potential creative capacities is a primary concern. Prerequisite for spring term; one prior term of ALA 187.

ALA 199 Special Studies
Terms and hours to be arranged

ALA 200 Delineation
3 hours each term, three terms 3 ②
Perception and communication by use of shade and shadow, orthographic projection, and perspective drawing necessary to indicate common architectural forms. Skills necessary for discrimination of form, color, and composition and for free experimentation of aesthetic expression. Pencil, pen and ink, and related media skills.

ALA 207,208,209
History and Theory of Architecture
3 hours each term 3 ①
Review of architectural theory and form as a reflection of its social, economic, political, intellectual, and religious context; roots of contemporary theory.

ALA 218,219,220 Construction
3 hours each term 3 ①
Material and methods, individual research, and observation, sketching existing examples, discussion, nature and functions of structure relating to building design, structures under load with study of limits and physical adequacy appropriate to their use.

ALA 223
Elements of Interior Space Planning
4 hours 4 ①
Scope, aim, and technique to give understanding of professional field. All work done in drafting room. Open to nonmajor students with consent of instructor.

ALA 287 Design Studio II
3 hours each term, three terms 3 ③
Major factors which influence design decisions, relation of the physical and human environment to design, integration of design considerations involved in the production of an art form. Required for majors in architecture, interior architecture, and landscape architecture. Prerequisite: ALA 187 or equivalent.

ALA 288 Interior Design
4 hours 4 ①
Introduction to the field, relation to architecture and allied arts, basic principles and planning processes by which interior spaces and forms are studied and executed.

ALA 297
Lower Division Architectural Design
1 to 3 hours three terms 1 ③ to 3 ③
Principles, methods, concepts, and ideas in architectural design and planning. Series of related problems studied and executed in plan, elevation, isometric perspective, and model in two-year sequence.

COURSES IN LANDSCAPE ARCHITECTURE

Lower Division Courses

ALA 199 Special Studies
Terms and hours to be arranged

ALA 280 Landscape Design Theory
3 hours fall or spring 2 ②
Functional and aesthetic aspects of landscape planning in the creation and preservation of human environment.

ALA 290,291 Landscape Design I
3 hours each term 3 ③
Application of theory to environmental planning and design. Prerequisite: ALA 280.

Upper Division Courses

ALA 326,327,328 Plant Materials
3 hours each term 2 ① 1 ②
Trees, shrubs, vines, and perennials and their uses in plant composition.

ALA 356,357,358 Influence of Man on His Physical Environs
2 hours each term 2 ①
Designed physical environment as an outgrowth of living conditions from early Egyptian to modern American times.

ALA 359,360,361
Landscape Construction
3 hours each term 3 ②
Landscape construction problems; topography, land forms, materials of construction; structures and construction techniques; grading and drainage.

ALA 390,391,392 Landscape Design II
3 hours each term 3 ②
A continuation of environmental planning and design with problems of greater complexity and broader scope. Prerequisite: ALA 280,291.

ALA 426,427,428 Plant Composition
3 hours each term 3 ②
Aesthetic and environmental aspects of plant materials, planting plans and specifications. Prerequisite: ALA 291,328.

ALA 490,491,492 Landscape Design III 4 hours each term 2 ③
A synthesis of all procedures and practices of planning and design in the development of comprehensive plans and specifications. Prerequisite: ALA 361,362.

ART

The curriculum in art is offered to develop and enrich the professional, intellectual, and cultural background of the student and to provide an awareness and understanding of the historical and contemporary significance of art as a unique element in society.

Major programs are designed to offer an extensive range of professional development in combination with a choice of other subjects leading to a broad and liberal education. These programs provide a basis for vocational opportunities or later graduate study in such fields as advertising design, applied design, photography, crafts, fine art, art history and art education.

The Department offers: (1) Degree programs leading to the B.A. and B.S. degrees in Art, and the B.F.A. degree in Applied Visual Arts. (2) Professional education for students planning to enter an art-oriented occupation or graduate school. (3) Teacher training for art-education certification. (4) Elective and service courses for students majoring in other departments. The Department also provides for exhibitions, lectures, workshops, and other presentations related to the visual arts.

Students who become candidates for the B.A. or B.S. degree concentrate in studio areas such as: advertising design, applied design, jewelry and metal design, photography, ceramics, drawing, sculpture, printmaking, painting, and fabric design. History of Art is offered as a concentration for B.A. candidates.

Those who are seeking an M.F.A. degree will concentrate in the fields of advertising/graphic design, fabric design, two- and three-dimensional design, jewelry and metal design, photography, or industrial ceramics.

Preparation for prospective teachers is provided in conjunction with art major programs leading to the B.A., the B.S., or the B.F.A. degree through the College of Liberal Arts. Such preparation will meet state certification requirements in art and education through a joint program offered with the cooperation of the School of Education. (For specific certification requirements see School of Education.)

Departmental requirements for B.A., B.S. in Art

Lower Division:	*Hours*
Basic Drawing (Art 105)	4
Basic Design (Art 195)	4
Introduction to the Visual Arts (Art 161)	4
Drawing (200-level)	3
Studio concentration (200-level)	3
Studio elective (200-level)	3
Intro to Art History (Art 261,262,263)	9
Upper Division Studio Option (B.A., B.S.)	
History of Art (300-level)	9
Studio elective	3
Studio concentration (300- and 400-level)	18
Upper Division Art History Option (B.A.)	
History of Art (300-level)	18
History of Art (400-level)	9
Art elective	3

Departmental requirements for B.F.A. in Applied Visual Arts

Lower Division	*Hours*
Basic Drawing (Art 105)	4
Basic Design (Art 195)	4
Introduction to the Visual Arts (Art 161)	4
Intro to Art History (Art 261,262,263)	9
Drawing (200-level)	3
Approved studio electives	18
Upper Division	
Art History	9
Drawing	9
Senior seminar	3
Approved studio and related electives	45

Applications for the B.F.A. normally will be accepted during applicant's fourth or fifth term of study, with completion and acceptance of terminal project required for approval of candidate for degree. Both acceptance of candidacy and approval for granting the degree are by departmental committee.

Lower Division Courses

Art 105 Basic Drawing
4 hours 4 ②
Traditional and contemporary techniques and concepts in drawing with special emphasis on analytical and expressive vision.

Art 161 Introduction to the Visual Arts
4 hours 4 ①
Lecture course supplemented by visual materials concerning elements, principles, and functions of the visual arts, both two- and three-dimensional, with a view toward cultivating appreciation and application.

Art 195 Basic Design
4 hours 4 ②
Fundamental concepts and theories introduced through study of basic elements, principles, and techniques of design.

Art 199 Special Studies
Terms and hours to be arranged

Art 231,232 Fabric Design
3 hours each term 2 ③
Application of original designs to textile and other materials by silk-screen printing and in weaving.

Art 235 Jewelry and Metal Design
3 hours 2 ③
Processes and techniques in designing, forming, and fabricating non-ferrous metals for jewelry construction and metalsmithing procedures.

Art 245,246 Lettering and Layout
3 hours each term 2 ③
Fundamentals of lettering and layout design with emphasis on essential techniques and use of tools.

Art 251,252 Drawing
3 hours each term 2 ③
Expressive modes of drawing and composition as related to media and technique. Enrichment of visual vocabulary. Some sections will be scheduled as life drawing.

Art 255,256 Ceramics
3 hours each term 2 ③
Basic materials and techniques of ceramics.

Art 261,262,263
Introduction to Art History
3 hours each term 3 ①
Architecture, painting, sculpture, and the minor arts from prehistory to the present. Special emphasis on the development of Western art. Prerequisite: Hst 101,102,103.

Art 275,276 Illustration
3 hours each term 2 ③
Illustration techniques and materials which can be applied generally to the needs of students in art, technical, or science fields.

Art 281 Printmaking
3 hours 2 ③
Basic techniques of lithography, intaglio, and woodcut printmaking.

Art 285,286 Sculpture
3 hours each term 2 ③
Basic materials and techniques of sculpture with an emphasis on expressive development.

Art 291,292 Painting
3 hours each term 2 ③
Introductory studio work in media, technique, and composition with either oils or water color according to section designation in schedule of classes.

Art 295,296 Three-Dimensional Design
3 hours each term 2 ③
Functions, structures, and applications of three-dimensional forms. Exploratory work challenging traditional and contemporary three-dimensional design concepts.

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit

Art 313 Art in Elementary Schools
3 hours 3 ②
Studio projects, discussions, and observations to give practical approach to arts and crafts instruction at preschool and elementary school levels. Prerequisite: Art 195.

Art 331 Fabric Design
3 hours any term, 2 terms 2 ③
Application of original designs to fabrics by batik dyeing, block and silkscreen printing, and in two- and three-dimensional design with fibers. Development of craftsmanship and creative possibilities of the media. Prerequisite: Art 195, 231,232.

Art 335 Jewelry and Metal Design
3 hours any term, 3 terms 2 ③
Design, technique, and skill development in jewelry construction with precious and semi-precious materials, and in metalsmithing hand processes of raising, forging, and fabrication with non-ferrous metals. Prerequisite: Art 195, 235.

Art 341,342,343 Photography
3 hours each term 3 ②
Deals with photographic technology as a resource for creative expression. Inventive possibilities of the medium stressed. Problems in design and visual theory along with limited demonstrations on technical processes. Prerequisite: Art 195.

Art 345,346,347 Advertising Design
3 hours each term 3 ②
Lecture and studio projects in advanced layout and lettering typography, production methods in printing; illustration techniques. Prerequisite: Art 105,195,245.

Art 351,352,353 Drawing
3 hours each term 3 ②
Conceptual analysis of form: continued research in media and techniques. Some sections will be scheduled as life drawing. Prerequisite: Art 105, 251.

Art 355,356,357 Ceramics
3 hours each term 3 ②
Methods for forming clay pottery continued. Use of textures and glazes. Prerequisite: Art 195, 255.

Art 361,362,363 History of Art
3 hours each term 3 ①
Principal stylistic manifestations of European architecture, sculpture, and painting from Middle Ages to seventeenth century. May be taken in any order. *Art 361:* Medieval; *Art 362:* The Renaissance; *Art 363:* Baroque Art. Prerequisite: Art 261,262,263.

Art 364,365,366 History of Art
3 hours each term 3 ①
Principal movements in painting, sculpture, and architecture in Europe and America since 1700. *Art 364:* Eighteenth Century. *Art 365:* Nineteenth Century. *Art 366:* Twentieth Century. May be taken in any order. Prerequisite: Art 261,262,263.

Art 371 Creative Art Projects
3 hours any term six terms 3 ②
Advanced studio work on approved projects in drawing, painting, sculpture, graphic arts, ceramics, metal design, and fabric design. Upper division standing, one year lower division work in the selected medium, and approval of instructor required.

Art 381,382,383 Printmaking
3 hours each term 3 ②
Basic techniques of lithography, relief, and intaglio; development of craftsmanship and creative possibilities of the media. Prerequisite: Art 105,281.

Art 385,386,387 Sculpture
3 hours each term 3 ②
Life modeling, anatomical studies, figure composition employing traditional and experimental media. Prerequisite: Art 195,285.

Art 391,392,393 Painting
3 hours each term 3 ②
Composition and techniques continued; figure composition, space concepts. Prerequisite: Art 105,195,291.

Art 395,396,397 Design
3 hours each term 3 ②
Explorations with two- and three-dimensional design principles related to display, packaging, and production design with an emphasis on the design process. Prerequisite: Art 195,295.

Art 401 Research

Art 402 Independent Study

Art 403 Thesis
Terms and hours to be arranged

***Art 405 Reading and Conference (g)**

***Art 406 Projects (g)**

***Art 407 Seminar (g)**

Art 408 Workshop (g)
Terms and hours to be arranged

Art 415 Art Education: Elementary (g)
3 hours 3 ①
Current thinking and practice regarding the processes of learning through art; creative process examined through laboratory work, observation, and research. Prerequisite: enrollment in teaching-norm program.

Art 416 Art Education: Secondary (g)
3 hours 3 ①
Current thinking and practice regarding the processes of learning through art. Creative process examined through laboratory work, observation, and research. Prerequisite: enrollment in teaching-norm program.

Art 421
Art Problems in Elementary Schools
(g) 3 hours 3 ①
Research and literature in early childhood art education. Laboratory work and research coordinated with observation of children working with art materials. Investigation of problems related to classroom procedure. Prerequisite: Art 313.

Art 435 Senior Studio: Metals (g)
4 hours any term, 3 terms 3 ③
Individual study in approved directions to further development of design and technique for jewelry construction, metalsmithing procedures, and other related areas. Prerequisite: 9 hours of Art 335.

Art 441,442,443 Advanced Photography
(g) 3 hours each term 2 ③
Using the camera as a tool to sharpen aesthetic and visual perception. Prerequisite: Art 341,342, 343.

Art 445,446,447
Advanced Advertising Design (g)
3 hours each term 3 ②
Finished work in advertising illustration in specific directions for a professional portfolio, plus a terminal project. Prerequisite: Art 345,346, 347.

Art 451,452,453 Drawing
3 hours each term 3 ②
Advanced work in drawing; individual research in media, technique, and expression. Some sections scheduled as life drawing. Prerequisite: Art 351,352,353.

Art 455,456,457 Advanced Ceramics
(g) 3 hours each term 3 ②
Perfection of ceramic skills and the growth of imaginative craftsmanship. Prerequisite: Art 355, 356,357.

Art 461,462,463 Styles in Modern Art
(g) 3 hours each term 3 ①
From 1800 to the present. Relationships between American and European styles and movements such as neoclassicism, romanticism, realism, and twentieth-century movements. Prerequisite: 9 hours of upper division art history.

Art 481,482,483 Advanced Printmaking
(g) 3 hours each term 3 ②
Workshop instruction in making and printing engravings, etchings, lithographs, linoleum cuts, and woodcuts. Prerequisite: Art 381,382,383.

Art 485,486,487 Advanced Sculpture
(g) 3 hours each term 3 ②
Mature uses of sculptor's materials and media, exploration of sculptor's potentialties. Prerequisite: Art 385,386,387.

* Graduate credit under Art 405, 406, and 407 may not total more than 9 hours.

Art 491,492,493 Advanced Painting
(g) 3 hours each term 3 ②
Application of techniques used in contemporary painting with emphasis upon student's personal development. Prerequisite: Art 391,392,393.

Art 495,496,497 Advanced Design (g)
3 hours each term 3 ②
Mature artistic experimentation into both two- and three-dimensional design areas with emphasis upon student's personal development. Prerequisite: Art 395,396,397.

ECONOMICS

The Department of Economics offers a major program leading to the B.A. or B.S. degree. Instruction serves the cultural and informational needs of all students interested in economic problems in relation to citizenship; it provides a sound basis for later professional or graduate education in economics; supplies a foundation for law, business, or public service; and meets the prescriptions found in professional curricula.

Departmental requirements:

An economics major must complete at least 45 term hours of economics courses, including Principles of Economics (Ec 213,214), Microeconomic Theory (Ec 357), Macroeconomic Theory (Ec 475), an approved course in statistics, and 27 additional hours of upper division economics. The program must include at least two upper division sequences.

Some upper division economics courses are offered on an irregular basis. Students and advisers should consult with the department chairman regarding scheduling of particular courses.

Lower Division Courses

Ec 115 Outlines of Economics
4 hours 4 ①
Principles and institutions. May not be taken in place of Ec 213 or 214.

Ec 199 Special Studies
Terms and hours to be arranged

Ec 213,214 Principles of Economics
4 hours each term 4 ①
Economic theory, policy, and institutions.

Ec 215 Economic Development of the United States
3 hours 3 ①
Economic institutions including industry, agriculture, commerce, transportation, labor, and finance; economic progress of the United States.

Ec 220 Contemporary United States Economic Issues
3 hours 3 ①
Applications of economic principles to selected issues affecting U.S. economy with such topics as poverty, pollution, urbanization, etc. Prerequisite: 3 hours of introductory economics.

Ec 230
Contemporary World Economic Issues
3 hours 3 ①
Applications of economic principles to selected issues and problems of foreign economies and international economic institutions with such topics as overpopulation, socialism, multinational corporations, etc. Prerequisite: 3 hours of introductory economics.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Ec 357 Microeconomic Theory
3 hours 3 ①
Intermediate microeconomic theory, prices and output under various market structures. Prerequisite: Ec 115 or Ec 214.

Ec 380
Survey of Quantitative Economics
3 hours 3 ①
Mathematics and statistics used in analysis of economic problems and applications to economic theory and measurement. Prerequisite: Ec 214.

Ec 401 Research
Ec 402 Independent Study
Ec 403 Thesis
Terms and hours to be arranged

Ec 405 Reading and Conference (g)
Terms and hours to be arranged. Graduate credit limited to 9 hours.

Ec 406 Projects
†Ec 407 Seminar (g)
Ec 408 Workshop (g)
Terms and hours to be arranged

†Ec 411,412
Monetary and Banking Theory (g)
4 hours each term 4 ①
Nature and functions of money; commercial banking; the money market; monetary, credit, and central banking theory; domestic and international impacts of monetary policy; nonbank financial institutions; foreign banking systems and international banking agencies. Prerequisite: Ec 214.

Ec 414 Regional Economics (g)
4 hours 4 ①
Determination of level of economic activity within a region. Techniques of regional analysis; location theory, intersectorial flow analysis, input-output analysis, economic base theory. Prerequisite: Ec 214.

Ec 415 Urban Economics (g)
4 hours 4 ①
Implications of agglomeration on the economic base, housing and land use patterns, transportation, the public economy, and social disorganization. Prerequisite: Ec 214.

Ec 425 Labor Problems (g)
3 hours 3 ①
Sources and nature, labor movement history and objectives, union organizations, public regulation of unions, collective bargaining procedures, collective bargaining contracts. Prerequisite: Ec 214.

Ec 426 Labor Legislation (g)
3 hours 3 ①
Basis of labor, legality of unions and their activities, labor injunctions, unions and antitrust laws, the Norris-La Guardia Act, the National Labor Relations Act and its amendments, the N.L.R.B. and unfair labor acts, cases interpreting labor laws. Prerequisite: Ec 214.

Ec 427 Labor Economics (g)
3 hours 3 ①
Wage determination, distribution theory as applied to wages, employment theory, economic insecurity and public policy, social security. Prerequisite: Ec 214.

Ec 429,430 Public Finance (g)
4 hours each term 4 ①
Survey of government taxing, spending, borrowing with emphasis on current issues of theory and practice at federal, state, and local levels; shifting and incidence; fiscal policy for stability and growth. Prerequisite: Ec 214.

† Applicable toward a graduate major in agricultural economics, School of Agriculture.

Ec 440,441 International Economics
(g) 4 hours each term 4 ①
International trade, international financial arrangements, trade restrictions, capital movements, exchange rates, international economic organizations and financial institutions, comparative growth. Prerequisite: Ec 214.

Ec 445,446 Economic Development
(g) 3 hours each term 3 ①
Theories and policies for economic development in both the developing and developed parts of the world. Prerequisite: Ec 214.

Ec 448
Economic Survey of Latin America (g)
3 hours 3 ①
Evolution of economic systems in Latin America, contemporary organizational forms, institutional economic relations. Prerequisite: Ec 214.

Ec 450,451
Comparative Economic Systems (g)
4 hours each term 4 ①
Contemporary economic systems; capitalism, socialism, communism. Prerequisite: Ec 214.

Ec 453 Soviet Economics (g)
4 hours 4 ①
Societ economic history and structure, economic calculation and performance, money and finance, trends and prospects. Prerequisite: Ec 214.

Ec 454
Economic History of Modern Europe
(g) 4 hours 4 ①
The industrialization of Europe, origin and development of economic institutions, implications for the industrialization of underdeveloped areas. Prerequisite: Ec 214.

Ec 458,459 Microeconomic Theory (g)
3 hours each term 3 ①
Decision making in an enterprise economy, price and output under various market structures, welfare economics. Prerequisite: Ec 214.

Ec 461 Industrial Organization (g)
4 hours 4 ①
Industrial and financial dimensions of U.S. business and their implications for economic efficiency, economic power, and social control. Prerequisite: Ec 214.

Ec 470 History of Economic Thought
(g) 5 hours 5 ①
Theory dealing with socio-economic problems. Prerequisite: Ec 214.

†Ec 475,476
Macroeconomic Theory and Policy (g)
4 hours each term 4 ①
National income and product accounts; theory of aggregate demand, employment, price level, economic growth; monetary and fiscal policy; current economic problems. Prerequisite: Ec 214.

†Ec 480,481,482
Mathematical Economics (g)
3 hours each term 3 ①
Quantitative methods of economic research; economic programming, input-output analysis. Prerequisite: Ec 214; Mth 111 or 163.

Ec 483 Econometrics (g)
4 hours 4 ①
Theory and application of statistical and mathematical methods to problems of economics; model building and testing of demand, production, and macroeconomic hypotheses. Prerequisite: two terms of statistics; Ec 357,380,475; permission of instructor.

Ec 487 American Economic History
(g) 4 hours 4 ①
Economic development of U.S. from colonial times to present. Prerequisite: Ec 214.

Ec 499 Topics in Economic Analysis
(g) 4 hours 4 ①
Theory of production; market structure, conduct, and performance; theory of national income determination; monetary system; monetary and fiscal policy. Prerequisite: senior standing.

Graduate Service Courses
See also courses marked (g) above.

Ec 512,513
Economic History and Development
3 hours each term 3 ①
Historical development of industrial economies, sources of historical change, structural characteristics, long-term growth trends.

Ec 514,515,516
Contemporary Economic Thought
3 hours each term 3 ①
Twentieth century economics; value theory, welfare economics, imperfect competition; institutionalism; theory of employment, money, national income, economic, fluctuations; growth; innovations in methodology. Prerequisite: Ec 375,476, 477, or equivalent.

Ec 527,528
History of Economic Thought
3 hours each term 3 ①
Contribution of greatest economic thinkers from earliest times to present with particular attention to schools of thought.

ENGLISH

The Department of English offers instruction in literature and writing to meet the needs of students (1) who seek the cultural and intellectual values of the undergraduate major, (2) who plan to teach English in the elementary and secondary schools, (3) who plan to pursue graduate work in English, and (4) who desire the broadening influence of humanistic studies.

Departmental requirements:

English majors must complete university language requirements for the B.A. degree; complete one year of Shakespeare, one year of either Survey of English Literature or World Literature, and a total of 27 hours in upper division courses in the department, including 9 hours in literature before 1800 and 9 hours in literature since 1800; and must include History of Western Civilization.

Courses required for certification as a teacher of English in Oregon high schools are listed under SCHOOL OF EDUCATION.

COURSES IN LITERATURE

Lower Division Courses

Eng 101,102,103
Survey of English Literature
3 hours each term 3 ①
English literature presented in chronological sequence: *Eng 101:* From Beowulf to Milton. *Eng 102:* From Milton through Coleridge. *Eng 103:* From Byron to the present.

Eng 104,105,106
Introduction to Literature
3 hours each term 3 ①
Study of types of literature for greater understanding and enjoyment. *Eng 104:* primary emphasis on fiction. *Eng 105:* on drama. *Eng 106:* on poetry.

Eng 107,108,109 World Literature
3 hours each term 3 ①
The great plays, poems, and novels of western civilization. *Eng 107:* The Classic World: Hebrew, Greek, Roman, and Christian to St. Augustine. *Eng 108:* The Renaissance to the Age of Reason; Dante to Voltaire. *Eng 109:* The Romantic Revolt; Goethe to Gide.

Eng 199 Special Studies
Terms and hours to be arranged

Eng 201,202,203 Shakespeare
3 hours each term 3 ①
The major plays.

Eng 211 Selected Topics in Literature and Language
3 hours 3 ①
May he repeated for credit. See *Schedule of Classes* for term offerings.

Eng 253,254,255
Survey of American Literature
3 hours each term 3 ①
Readings from American literature with emphasis on major writers. *Eng 253:* colonial and early national literature to Emerson and Thoreau. *Eng 254:* Whitman to Dreiser. *Eng 255:* Sinclair Lewis to the present.

Eng 256
Literature of the Black Man in America
3 hours 3 ①
Study of literary production of America and elsewhere reflecting the contribution of Black writers to our literary heritage.

Eng 263 Great Books
3 hours 3 ①
Great hooks of the world and their influence.

Eng 275 The Bible as Literature
3 hours 3 ①
Structure, literary types, ideas of the Bihle; its influence on our literature.

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may he taken for graduate credit.
Some 400-level courses are offered in alternate years. See SCHEDULE OF CLASSES.

Eng 340,341,342
Literature of the Irish Renaissance
3 hours each term 3 ①
Irish fiction, drama, and poetry, with emphasis on the works of Joyce, Yeats, Synge, and O'Casey.

Eng 345 Methods and Materials of Literary Criticism
3 hours 3 ①
Critical analysis and evaluation of literary texts, based on the principles of literary judgment. Prerequisite: junior standing.

Eng 354,355,356
Continental European Literature
3 hours each term 3 ①
Continental European literature in translation, chiefly French, German, and Russian. *Eng. 354:* 1870 to 1914; *Eng 355:* 1918 to 1939; *Eng 356:* 1945 to the present.

Eng 374 The Short Story
3 hours 3 ①
Survey of the short story; reading and analysis of masterpieces of the form.

Eng 394,395,396
Twentieth-Century Literature
3 hours each term 3 ①
Twentieth-century American and British fiction, drama, and poetry.

Eng 397
Advanced Studies in Black Writers
3 hours 3 ①
In-depth analysis of major Black writers; themes, structure, trends in fiction, drama, and poetry of such writers as Hughes, Wright, Baldwin, Jones, Ellison. Prerequisite: Eng 256.

Eng 401 Research
Eng 402 Independent Study
Eng 403 Thesis
Eng 405 Reading and Conference (g)
Eng 406 Projects
Eng 407 Seminar (g)
Eng 408 Workshop
Terms and hours to be arranged

Eng 411,412,413
Development of the Drama (g)
3 hours each term 3 ①
Reading and analyzing plays. *Eng 411:* ancient and medieval. *Eng 412:* Renaissance and Neoclassical. *Eng 413:* Romantic and modern. Prerequisite: 9 hours of literature.

Eng 414,415,416 Literary Criticism
(g) 3 hours each term 3 ①
Theory and practice of chief literary critics from Plato to the present. Prerequisite: 18 hours of literature.

Eng 417,418,419 The English Novel
(g) 3 hours each term 3 ①
Selected English novels from the eighteenth century to the present. *Eng 417:* Richardson through Austen. *Eng 418:* Scott through Eliot. *Eng 419:* Conrad through Greene. Prerequisite: 18 hours of literature.

Eng 425,426,427
Early English Literature (g)
3 hours each term 3 ①
Old and Middle English literature with an introduction to the language. Emphasis primarily on Chaucer. Prerequisite: 9 hours of literature.

Eng 430,431,432
Literature of the Renaissance (g)
3 hours each term 3 ①
Thought and literary types from late fifteenth century to early seventeenth, exclusive of Shakespeare. Prerequisite: 9 hours of literature.

Eng 436,437,438 Advanced Shakespeare
(g) 3 hours each term 3 ①
Intensive study of selected plays. Prerequisite: Eng 201,202,203 or equivalent.

Eng 440,441,442
Seventeenth-Century Literature (g)
3 hours each term 3 ①
Poetry and prose from 1603 through the Restoration. Prerequisite: 9 hours of literature.

Eng 444
Milton's Minor Poems and Prose (g)
3 hours 3 ①
The development of Milton's poetry to 1658 and selected readings from the major prose. Prerequisite: 9 hours of literature, including Eng 101.

Eng 445 Milton's Major Poems (g)
3 hours 3 ①
Paradise Lost, Paradise Regained, and *Samson Agonistes.* Prerequisite: 9 hours of literature, including Eng 101.

Eng 450,451,452
Eighteenth-Century Literature (g)
3 hours each term 3 ①
Poetry and prose of the century as they relate to social, political, aesthetic, and scientific ideas of the period. Prerequisite: 9 hours of literature.

Eng 454 Individual Authors (g)
3 hours 3 ①
Major English authors as listed in the *Schedule of Classes*. May be repeated for credit. Prerequisite: 9 hours of literature.

Eng 460,461,462
Literature of the Romantic Period (g)
3 hours each term 3 ①
Prose and poetry from Wordsworth and Coleridge to Keats and Shelley; ideas and aesthetics of period. Prerequisite: 9 hours of literature.

Eng 463,464,465
Literature of the Victorian Period (g)
3 hours each term 3 ①
The nonfictional prose and poetry of the later nineteenth century from Carlyle, Tennyson, Browning, and Arnold through Pater and the writers of the 1890's. Prerequisite: 9 hours of literature.

Eng 481,482,483
Major American Writers (g)
3 hours each term 3 ①
Intensive study each term of two or three major authors such as Hawthorne, Emerson, Whitman, Melville, James, Twain, Dickinson, Frost, Eliot, Hemingway, Faulkner. Prerequisite: 9 hours of literature.

Eng 487 Children's Literature (g)
3 hours 3 ①
Reading material suitable for elementary grades and criteria used in selecting books for children.

Eng 488 Literature for Teachers (g)
3 hours 3 ①
For students who plan to teach English. Critical reading and analysis of literature selected primarily from State-adopted texts.

Eng 490
Development of the English Language
(g) 3 hours 3 ①

Eng 491 The Structure of English (g)
3 hours 3 ①
New analytic and descriptive methods applied to English grammar. Prerequisite: senior standing.

Eng 495,496,497
The Democratic Tradition in Literature
(g) 3 hours each term 3 ①
The ideas of democracy as reflected in English and American literature. Prerequisite: 9 hours of literature.

AUXILIARY COURSES

Lower Division Courses

Eng 91,92,93
English for Foreign Students
3 hours each term 3 ①
Vocabulary building, reading, writing, speaking, and comprehension of spoken discourse adapted to needs of individual.

Eng 115 Effective Reading
3 hours any term 3 ①
To develop better comprehension and greater speed in reading. Offered in summer term.

Eng 116 Vocabulary Building
3 hours any term 3 ①
Vocabulary improvement through reading; study of roots and prefixes with frequent progress tests. Open to freshmen and sophomores only.

COURSES IN WRITING

Lower Division Courses

[1]Wr 111,112,113 English Composition
3 hours each term 3 ①
Readings in literature with frequent written compositions emphasizing clarity and accuracy. Courses must be taken in sequence.

[2]Wr 121,222,323 English Composition
3 hours any term 3 ①
Introduction to methods of exposition; rudiments of the research paper, techniques of argument and persuasion, the elements of style. Wr 121 prerequisite to Wr 222; Wr 222 prerequisite to Wr 323.

Wr 199 Special Studies
Terms and hours to be arranged

Wr 214 Business English
3 hours any term 3 ①
Current practices in producing clear, concise business letters with appropriate emphasis on psychology and salesmanship. Prerequisite: Wr 121.

Wr 224 Introduction to Fiction Writing
3 hours 3 ①
Discussion workshop; encouragement of rudimentary talents. Student work examined in context of contemporary published work. Prerequisite: Wr 121. May be repeated to form a 6- or 9-hour sequence.

Wr 230 Effective Writing
3 hours 3 ①
Open only to students who place low on the comprehensive English examination required by some schools. Prerequisite: Wr 121.

Wr 233,234,235 Advanced Writing
3 hours each term 3 ①
Study and practice at a more advanced level than freshman composition. Prerequisite: Wr 121.

Wr 241 Introduction to Poetry Writing
3 hours 3 ①
Discussion workshop. Rudiments of mechanics and some background in development of modern poetry. Prerequisite: Wr 121. May be repeated to form a 6- or 9-hour sequence.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Wr 316 Advanced Expository Writing
3 hours any term, 2 terms 3 ①
Study and writing of exposition. Prerequisite: Wr 121.

Wr 324 Short Story Writing
3 hours any term, 3 terms 3 ①
Study and writing of the short story. Prerequisite: Wr 121.

Wr 327 Technical Report Writing
3 hours any term 3 ①
The various skills and forms used in technical communication. Prerequisite: Wr 121.

Wr 341 Poetry Writing
3 hours any term, 3 terms 3 ①
Study and writing of verse. Prerequisite: Wr 121.

Wr 401 Research

Wr 402 Independent Study

Wr 403 Thesis

Wr 404 Writing and Conference (g)

Wr 406 Projects
Terms and hours to be arranged

Wr 407 Seminar (g)

Wr 408 Workshop
Terms and hours to be arranged

Wr 411 English Composition for Teachers (g) 3 hours 3 ①
For students expecting to teach English.

[1] Available only to students in certain nondegree programs by prearrangement with the Department of English.

[2] A student is expected to take Wr 121 as a freshman, Wr 222 as a sophomore, and Wr 323 as a junior. The term in which a student takes Wr 121, 222, and 323 is determined alphabetically. See *Schedule of Classes*. Upon approval of the dean of his school and prearrangement with the Department of English a student may substitute Wr 316 or Wr 327 for Wr 323.

GEOGRAPHY

The Department of Geography is a joint department of the College of Liberal Arts and the College of Science. Both undergraduate and graduate majors are administered through the College of Science.

College of Liberal Arts courses offered for social science credit serve four purposes: (1) the general education needs of students majoring in other departments, (2) the subject norm requirements of social studies teachers, (3) course requirements for a geography major in the College of Science or for a Liberal Studies major in the College of Liberal Arts, and (4) needs of graduate minors.

The following courses are recommended for a minimum geography concentration:

Lower Division: Geog 105,106,107, Introductory Geography, Ggs 227, Introduction to Physical Geography, and Ggs 261, Maps and Map Interpretation.

Upper Division: Geog 321,322,323 and 12 hours of 400-level geography courses.

Students contemplating graduate work in geography are urged to take an appropriate foreign language and two terms of statistics.

Lower Division Courses

Geog 105,106,107
Introductory Geography
3 hours each term 3 ①
Principles and structure of geography. *Geog 105:* Cultural geography. *Geog 106:* World regional geography. *Geog 107:* Economic geography.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Geog 313
Geography of the Pacific Northwest
3 hours 3 ①
Human and economic geography of Pacific Northwest with special reference to Oregon. Prerequisite: Geog 107.

Geog 321,322 Cultural Geography
3 hours each term 3 ①
Geog 321: Agency of man in environmental alteration and landscape change. *Geog 322:* Spatial aspects of man's cultural traits and imprints on the earth. Prerequisite: Geog 106.

Geog 323 Geography of Settlement
3 hours 3 ①
Settlement processes, structure, pattern, order; taxonomy and typology. Prerequisite: Geog 107.

Geog 326 Geography of Europe
3 hours 3 ①
Physical and cultural environment and economic activities of each political unit (excluding U.S.S.R.). Prerequisite: Geog 107.

Geog 328 Geography of Latin America
3 hours 3 ①
Regional analysis of the Latin American nations, industrial and commercial development and potentialities. Prerequisite: Geog 107.

Geog 329 Geography of United States
3 hours 3 ①
Economic and settlement geography, current problems in man-environment relationships. Prerequisite: Geog 107.

Geog 331 Geography of Asia
3 hours 3 ①
Asiatic countries including the island fringe; human, cultural, and economic conditions; national economies and world relationships; implications for present and future. Prerequisite: Geog 107.

Geog 332 Geography of Africa
3 hours 3 ①
African nations and colonies; human, cultural, and economic conditions; national economies and world relationships; implications. Prerequisite: Geog 107.

Geog 405 Reading and Conference (g)
Terms and hours to be arranged

Geog 427
Geography of the Soviet Union (g)
3 hours 3 ①
Resources, peoples, economic activities, regions, and world position of the Soviet Union. Prerequisite: 9 hours of geography.

Geog 428,429,430 Europe (g)
3 hours each term 3 ①
Cultural and physical processes that have shaped man's organization and use of Europe, spatial evidences of man's developments, significance of Europe in the world's cultural-economic patterns. *Geog 428:* Historical geography. *Geog 429:* Cultural geography. *Geog 430:* Economic geography. Prerequisite: Geog 323.

Geog 480 Geography of Transportation
(g) 4 hours 3 ① 1 ②
Concepts, principles, and underlying bases of areal exchange emphasizing the movement of goods and forms of transportation. Spatial interaction is examined through models and graph theory. Prerequisite: Geog 323.

Geog 481 Geography of Manufacturing
(g) 4 hours 3 ① 1 ②
The location of manufacturing activity. Empirical and theoretical examinations of the determinants of location, including intraurban location. Techniques of measurement of areal associations and relationships in manufacturing. Prerequisite: Geog 323.

Geog 482 Urban Geography (g)
4 hours 3 ① 1 ②
Relationships between city and region; concepts of number, size, arrangement, function, and structure of urban centers; the role of urban centers in dispensing goods and services; and urban economic base. Prerequisite: Geog 323.

Geog 483
Techniques of Regional Analysis (g)
4 hours winter 3 ① 1 ②
Measurement and univariate analysis of spatial components that give identity and structure to regions, multivariate analysis of relationships and associations of combinations of regional components. Prerequiite: 12 hours of upper division geography; one term of statistics.

HISTORY

The Department of History offers major programs leading to the B.A. and B.S. degrees. Courses provide fundamental background for the social sciences and humanities and are of special value to students of law, journalism, and business.

Students are urged to complete language requirements for the B.A. degree. Their programs will be worked out with their advisers. Those interested in high school teaching may have their programs planned to satisfy state certification requirements.

Departmental requirements:

Minimum term hours required	45
Minimum upper division hours, including 9 hours of 400-level courses	27
Courses that must be included in the 45-hour minimum:	
Hst 101,102,103 or 121,122, or equivalent courses approved by adviser	9–10
Sequence in U. S. history	9
Courses in a non-European, non-U. S. history area	8
Hst 309 Colloquium	3
Hst 407 Seminar	5

Lower Division Courses

Hst 101,102,103
History of Western Civilization
3 hours each term 3 ①
History of man; his governmental, economic, social, religious, intellectual, and aesthetic activities in Europe, Asia, and Americas. Special effort made to relate past to contemporary events and institutions.

Hst 121,122
History of Western Civilization
5 hours each term 5 ①
Similar to Hst 101,102,103. A two-term sequence.

Hst 199 Special Studies
Terms and hours to be arranged

Hst 201,202,203
History of the United States
3 hours each term 3 ①
Rise and development from beginning to present; economic, social, and cultural life, political changes, and international relations.

Hst 221,222
History of the United States
5 hours each term 5 ①
Similar to Hst 201,202,203. A two-term sequence.

Hst 230,231,232 Great Americans in Thought and Action
2 hours each term 2 ①
Personality and leadership of men and women who have been outstanding in various fields of endeavor, great movements, and critical periods.

Hst 265,266
History of Black Americans
4 hours each term 4 ①
The forces and personalities that have shaped the history of Black Americans in the United States. *Hst 265:* African beginnings to the close of Reconstruction; *Hst 266:* Close of Reconstruction to the present.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Hst 307 Seminar

Hst 309 Colloquium
Terms and hours to be arranged

Hst 321,322 Greece and Rome
4 hours each term 4 ①
Hst 321: History of Greece. Ancient Greek city-states, their political and cultural evolution, their decline, and permanent contribution to Western Civilization. *Hst 322:* History of Rome. Growth of ancient Rome to a world power and her subsequent decline and fall.

Hst 324,325,326 The Middle Ages
3 hours each term 3 ①
Cultural, political, and economic history of the Middle Ages.

Hst 331,332,333 Early Modern Europe
3 hours each term 3 ①
Renaissance, reformation, scientific revolution, absolute monarchy, the age of reason. Offered alternate years.

Hst 335,336,337 Europe Since 1789
4 hours each term 4 ①
Political, economic, social, and intellectual developments since the French Revolution. *Hst 335:* 1789-1890. *Hst 336:* 1890-1939. *Hst 337:* 1939-present.

Hst 350,351 Modern Latin America
4 hours each term 2 ① 1 ②
History of the republics of Middle and South America, emphasizing the reaction to imperialism and the growth of nationalism and internationalism.

Hst 381,382 History of Africa
4 hours each term 4 ①
Emphasis on Africa south of the Sahara. *Hst 381:* The history of African cultures from the beginning of the Iron Age to 1880; the impact of Islam and of Europe. *Hst 382:* The partition of Africa and the establishment of European control; resistance movements, nationalism, and the process of decolonization; independence and problems of modernization.

Hst 387,388,389
History of the Middle East
3 hours each term 3 ①
A political, social, and religious survey from the 7th century to the present, including rise and fall and heirs of the Islamic Empire, institutions of the Ottoman Turks, impact of Western imperialism upon the Middle East, evolution of new nations after World War I, and the Arab-Israeli conflicts. Prerequisite: Hst 101,102, 103 or upper division standing. Offered alternate years. Offered 1974-75.

Hst 391,392 East Asia
4 hours each term 4 ①
History and culture of China, Japan, Korea, and Southeast Asia.

Hst 401 Research

Hst 402 Independent Study

Hst 403 Thesis

***Hst 405 Reading and Conference** (g)

Hst 406 Projects

***Hst 407 Seminar** (g)
Terms and hours to be arranged

GS 411,412,413 History of Science
(G) 3 hours each term 3 ①
See GENERAL SCIENCE.

Hst 427,428,429
History of Western Thought (g)
3 hours each term 3 ①
History of aesthetic, social, political, philosophical, and scientific thought and of the intellectual milieu in which they have developed. *Hst 427:* 500 B.C.-1700 A.D.; *Hst 428:* 1700 A.D.-1860 A.D.; *Hst 429:* 1860 A.D. to present. Prerequisite: Hst 101,102,103 or upper division standing. Offered alternate years.

Hst 430,431,432 English History (g)
3 hours each term 3 ①
Political, economic, social, intellectual, and religious developments since 1485; evolution from Empire to Commonwealth and Britain's part in transition. Prerequisite: Hst 101,102,103 or upper division standing. Offered alternate years.

Hst 435,436
History of Modern Germany (g)
4 hours each term 4 ①
Political economic, social, and intellectual developments in the nineteenth and twentieth centuries. *Hst 435:* 1815-1914. *Hst 436:* 1914-present. Prerequisite: Hst 101,102,103, or upper division standing.

* Graduate credit under Hst 405 and 407 may not total more than 9 hours.

Hst 440,441 History of Russia (g)
4 hours each term 4 ①
Political, economic, social, and cultural developments from the origins of the Russian state through the Stalinist regime. *History 440:* 862-1801. *History 441:* 1801-1953. Prerequisite: Hst 101,102,103 or upper division standing.

Hst 442 History of Soviet Political and Economic Institutions (g)
3 hours 3 ①
The Communist Party; state and public administration; State planning commission and public corporations; cooperatives, in theory and structure. Prerequisite: Hst 101,102,103 or upper division standing.

Hst 456
Problems in Latin American History
(g) 4 hours spring 1 ② 2 ①
Origins and development of political instability and social economic stagnation in parts of Latin America; selective problems endemic to the region. Prerequisite: Hst 350 or 351.

Hst 460,461,462
American Thought and Culture (g)
3 hours each term 3 ①
American thought, ideals, and institutions; contribution to American culture by schools, newspapers, magazines, motion pictures, radio, art, literature, television, and philosophy. Prerequisite: Hst 201,202,203.

Hst 464,465
American Diplomatic History (g)
4 hours each term 4 ①
American diplomatic relations from the nation's founding to 1898 and from 1898 to the present. Prerequisite: Hst 201,202,203 or upper division standing. Offered alternate years.

Hst 467,468 The American Frontier
(g) 4 hours each term 4 ①
Advance of American settlement across successive frontiers in Continental United States and the contributions made by this movement to American political, economic, social, and cultural institutions. *Hst 467:* The Colonial and Trans-Appalachian Frontier; *Hst 468:* The Trans-Mississippi Frontier. Prerequisite: Hst 201,202, 203 or upper division standing.

Hst 469 History of Pacific Northwest
(g) 3 hours 3 ①
Growth and development of Oregon, Washington, and Idaho from Indian times to present, with emphasis on political, economic, social, cultural changes. Prerequisite: Hst 201, 202,203, or upper division standing.

Hst 471,472 Colonial America (g)
4 hours each term 4 ①
Economic, political, social, religious, and intellectual development of colonial North America from the English background to 1763. *Hst 471:* to 1689. *Hst 472:* 1689-1763. Prerequisite: Hst 201,202,203.

Hst 473 The American Revolution, the Constitution, and the Federalist Era (g)
3 hours 3 ①
The American Revolution, the drafting of the Constitution, and the political, social, economic, and cultural developments during the administrations of Washington and John Adams. Prerequisite: Hst 201,202,203 or upper division standing.

Hst 474
Jeffersonian and Jacksonian Democracy
(g) 4 hours 4 ①
American political, economic, religious, and social development during the early and middle national era with emphasis on the formation and growth of political parties, territorial expansion and western settlement, and the beginnings of sectional conflict. Prerequisite: Hst 201,202,203 or upper division standing.

Hst 475
Civil War and Reconstruction (g)
4 hours 4 ①
Origins of the war and of the critical post-war era from the 1830's to the 1880's. Special attention given to the changing historiography of the period. Prerequisite: Hst 201,202,203.

Hst 477
Progressivism and the New Deal (g)
4 hours 4 ①
Nature, programs, spirit, and objectives of the twentieth-century reform movements down to World War II; relationships of reform movements to the welfare state examined. Prerequisite: Hst 203.

Hst 478 Contemporary United States
(g) 4 hours 4 ①
Developments since 1939 which have promoted fundamental and profound shifts in American life, in particular the phenomenon of growing public and private questioning of the meaning and direction of American life in a world in revolutionary transition. Prerequisite: Hst 201, 202,203.

Hst 492 Japan Since 1854 (g)
4 hours 4 ①
Japan's emergence from isolation to the position of a world power. Prerequisite: Hst 391,392 or equivalent.

Hst 495
China in the Twentieth Century (g)
4 hours 4 ①
Revolutionary China from Confucian to Communist. Prerequisite: Hst 391,392 or equivalent.

JOURNALISM

The Department of Journalism offers a major program leading to a B.A. or B.S. degree in Technical Journalism. A minor is required in agriculture, business administration, engineering, forestry, home economics, pharmacy, safety studies, or science to provide specialized training in the fields to be written about.

Journalism may also be taken as an area of concentration in home economics communications, as a minor in general agriculture or other options in agriculture, or as a sports communication minor in the Division of Health and Physical Education.

For courses required for a basic teaching norm in journalism, see SCHOOL OF EDUCATION.

Journalism may also be used as a field of emphasis for a major in Liberal Studies.

Elementary courses furnish a background in communications media and the fundamentals of newswriting and editing. Others offer training in more specialized writing, layout and design, and photography. Students may gain experience by working on the *Barometer* and other student publications. Individual projects enable students to work closely with instructors and technical experts in developing publications, research papers, and articles.

Departmental Requirements (40 hours)

a. **Core Block** (28 hours): J 111,112,121, 214,318,319,333,393,406.

b. **Specialization Block** (12 hours) selected from: J 317,334,335,431,407,450; Wr 241,242,243,316; Sp 241,262,361,363, 367,368,420.

Technical Minor Requirements

Agriculture — 27 hours in approved courses in at least two of these departments: agricultural economics, agricultural education, agricultural engineering, agronomic crop science, animal science, fisheries and wildlife, food science and technology, horticulture, poultry science, rangeland resources, soil science, or veterinary medicine.

Applied Safety Studies—27 hours in approved courses in the Department of Health with a course in Industrial Environment Safety optional.

Atmospheric Sciences—30 hours in approved courses in meteorology, climatology, weather analysis, and other courses in the Department of Atmospheric Sciences.

Business Administration—32 hours in accounting, management, marketing, finance, business law, and other approved courses in the School of Business and Technology.

Civil Engineering Technology—36 hours in approved courses in technical problems, engineering drawing, mechanics, and other courses in civil engineering technology.

Computer Science—27-29 hours of approved courses, 18-20 of them in mathematics and statistics and 8-9 in one of three options: Systems Work, Mathematics, or Business.

Earth Science—2-29 hours in approved courses in geology, soil science, atmospheric sciences, and geography or oceanography.

Forestry — 27-29 hours in approved courses in one of four areas of concentration: Forest Management, Natural Resource Conservation, Forest Engineering, or Wood Industry Management.

Health Sciences—28-32 hours in approved courses in general science, microbiology, zoology, and health.

Home Economics—33 hours in approved courses in clothing and textiles, foods and nutrition, home management, and family life.

Oceanography—27 hours in approved courses, 18 of them in upper division oceanography courses, and 9 hours selected from fisheries, civil engineering, biology, general science, or zoology.

Pharmacy—27 hours of approved courses in pharmacy administration, pharmacology and toxicology, pharmacognosy, pharmaceutical chemistry, and pharmaceutical science.

Lower Division Courses

J 111,112 Journalism
3 hours each term 3 ①
Journalistic style of writing; workings of the press, both general and technical. J 111 is required for eligibility to serve on editorial staffs of student publications. Must be taken in sequence. Typing recommended.

J 121 Journalism Laboratory
1 hour any term
Given only in coordination with J 112 sections offering news beat experience.

J 199 Special Studies
Terms and hours to be arranged

J 214 Copyediting
3 hours any term 2 ① 1 ②
Copy reading, head writing, proofreading, and makeup; actual experience in editing copy. Required for advanced positions on the *Barometer*. Prerequisite: J 112.

J 223 Editorial Writing
3 hours 3 ①
Writing editorials, policy and ethics, makeup of editorial pages of trade journals and newspapers. Prerequisite: J 112.

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

J 317 Special Feature Articles
3 hours 3 ①
Writing of special articles along line of student's own major, study of media of such articles, practice in popularization of scientific material.

J 318 Public Information Methods
3 hours 3 ①
Planning and executing informational campaigns, methods of informing public of public affairs and other enterprises in which one is interested. Prerequisite: J 111.

J 319 Technical Reporting
3 hours 3 ①
Editing popular and scientific bulletins, preparing reports and writing articles for scientific publications, preparing radio manuscripts. Prerequisite: J 112.

J 333 Industrial-Business Publications
3 hours 1 ③
Introduction to industrial editing; principles and problems of editing company publications, industrial, business, and other specialized magazines. Prerequisite: J 214,334. Consent of instructor required.

J 334 Photojournalism
3 hours 2 ① 1 ②
Planning, taking, and processing pictures for newspapers, magazines, and television.

J 335 Mechanics of Publishing
3 hours 2 ① 1 ②
Printing processes; typographic development and display; type identification; paper and ink; copy fitting and estimating; design, layout, and processing of materials for publication. Prerequisite: J 214.

J 351 Journalism Projects
2 hours each term, 3 terms 1 ① 1 ②
Newswriting, copyediting, feature-writing, and technical-writing principles; experience on student publications; articles for trade and technical publications or material for general publications. Consent of instructor required. Prerequisite: J 214.

J 393
Contemporary Technical Journalism
3 hours 3 ①
Role, functions, and responsibilities of mass and specialized media in interpreting science and other technical fields to the reading public. Advanced technical reporting and writing, development of television and radio documentaries on specialized subjects. Research and discussion of specialized fields such as science, medicine, education, urban/rural problems, and the environment and their relationship to the government and public.

J 402 Independent Study
Terms and hours to be arranged

J 405 Reading and Conference (g)
Terms and hours to be arranged

J 406 Projects
Terms and hours to be arranged
Required of seniors majoring in technical journalism. Individual projects relating to the student's technical field. Should be taken as a block. Prerequisite: senior standing in technical journalism.

J 407 Seminar (g)
Terms and hours to be arranged

J 431 Broadcast Journalism (g)
3 hours 2 ① 1 ②
Philosophy and principles of broadcast news reporting; current operating practices in writing, editing, and presenting news for broadcast; use of audio and video tape, wire services, facsimile, film in news reporting by radio and television. Prerequisite: J 112; Sp 262.

J 450 The Media and Society (g)
3 hours 3 ①
Organization, operation, functions, duties, and responsibilities of the mass communication media. Role of consumers of the mass media.

J 455
Supervision of School Publications (g)
3 hours 3 ①
Teacher as adviser in guiding student publications, with consideration given to technical aspects of the school newspaper and yearbook. Prerequisite: J 214.

LIBERAL STUDIES

A major program in liberal studies leading to either a B.A. or B.S. degree is available for students whose academic and career interests suggest greater curricular breadth and flexibility than is available in other major programs.

Students entering this program are expected to indicate agreement with the purposes of the program and should consult the Director of Advising of the College of Liberal Arts.

Candidates for the B.A. or B.S. degree must complete the following:

1. University requirements for graduation (see page 14).

2. College of Liberal Arts distribution requirements (see page 35).

3. 45-60 term hours in approved courses from two or more departments of the College of Liberal Arts, at least 27 hours of which must be in upper division courses.

All course work in the major must be approved by the student's academic adviser.

Lower Division Course

LS 199 Special Studies
Terms and hours to be arranged

LS 306 Projects
Terms and hours to be arranged

Upper Division Courses

LS 307 Seminar
Terms and hours to be arranged

LS 311,312,313
Creative Epochs in Western Thought
3 hours each term. 1 ③
History, philosophy, science, art, and literature defining Western civilization. Creative periods of Western culture; fifth-century Greece; imperial Rome, and early Christianity; high middle ages; Renaissance; Reformation; English, American, French Revolutions; nineteenth and twentieth centuries. Prerequisite: year sequence in literature or social science.

LS 402 Independent Study

LS 403 Thesis

LS 406 Projects

***LS 407 Seminar (g)**

LS 408 Workshop
Terms and hours to be arranged

MODERN LANGUAGES

The Department of Modern Languages offers major programs leading to the B.A. degree in French, German, Russian, and Spanish, and lower division instruction in Italian and, upon occasion, in Portuguese and Chinese. The major programs provide the student with the opportunity to develop the basic language skills, as well as an understanding of and an appreciation for the foreign literature and culture.

Major requirements: Lower division courses are prerequisite to the major. Students with previous training or experience in the language will take a departmental examination to determine premajor requirements. The minimum upper division requirements in each major are:

Major in French

Survey of French literature	12
Intermediate composition and conversation	8
Approved upper division electives including at least 8 hours on the 400 level	18
	38

Major in German

Survey of German literature	9
Composition and conversation	12
Approved upper division electives including at least 8 hours on the 400 level	18
	39

Major in Russian

Survey of Russian literature	9
Intermediate composition and conversation	9
Approved upper division electives including at least 9 hours on the 400 level	21
	39

Major in Spanish

Survey of Spanish literature	8
Intermediate composition and conversation	8
Approved upper division electives including at least 6 hours on the 400 level	22
	38

The *Non-European Culture requirement* of the College of Liberal Arts must be met with courses in a second foreign language or in a non-European culture as approved by the student's adviser.

For future teachers, the department offers courses meeting the certification requirements of the Secondary Education Basic Norm and the Elementary Education Area of Concentration in French,

* Graduate credit in LS 407 may not total more than 9 hours.

German, Russian, and Spanish. See SCHOOL OF EDUCATION.

Courses numbered 400-499 and designated (g) may be taken as part of a graduate minor in another school or as one of the three fields acceptable for the M.A. degree in general studies. See GRADUATE SCHOOL.

The Department cooperates with other institutions of the State System of Higher Education in administering overseas study centers at Poitiers, Stuttgart, Tokyo, and Stockholm. See INTERNATIONAL EDUCATION and FOREIGN STUDY CENTERS.

Interdepartmental programs. The Russian language and literature courses fulfill the requirements of the major in Russian Studies. The department cooperates with other departments in offering an area of concentration in Linguistics under the Liberal Studies major.

A language laboratory provides opportunity for supervised instruction and supplemental practice and drill. Collateral tapes and recordings are available for both class use and for individual study.

Courses numbered 400-499 and designated (g) may be taken as part of a graduate minor in another school or as one of three fields acceptable for the M.A. degree in interdisciplinary studies. See GRADUATE SCHOOL.

GERMANIC LANGUAGES

German

Lower Division Courses

Ger 15,16,17 Scientific German for Graduate Students
No credit, summer only 5 ②
For graduate students who need to develop a basic competence in the scientific aspects of the language. Emphasis on translation from German to English. Third term requires lengthy translation project to demonstrate level of proficiency achieved. No auditors; students with senior standing may be admitted.

Ger 50,51,52 First-Year German
4 hours each term 4 ①
Pronunciation, grammar, reading, and conversation. For students with no previous training in German.

Ger 101,102 Second-Year German
5 hours each term 3 ① 2 ①
Ger 101A, 102A: Conversation, reading comprehension, and vocabulary building. *Ger 101B, 102B:* Grammar review and composition. Taught by two different instructors, with two grades given. Student must enroll in both A and B concurrently. Prerequisite: Ger 52 or placement.

Ger 199 Special Studies
Terms and hours to be arranged

Ger 203 Intermediate German
4 hours 2 ① 2 ①
Ger 203A: Conversation and oral comprehension. *Ger 203B:* Grammar review and reading comprehension. Taught by two instructors, with two grades given. Student must enroll in Ger 203A and 203B concurrently. Required for German majors, Stuttgart program, and upper division German courses. Prerequisite: Ger 102 or placement.

Upper Division Courses

Courses numbered 300-399 are open to lower division students.

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Ger 311,312
Introduction to German Literature
4 hours each term 4 ①
General concepts of literature and fundamental principles of poetics. Representative German prose, drama, and poetry with stress on comprehension. Recommended for all German majors. Prerequisite: Ger 203 or placement.

Ger 320,321,322 Scientific German
3 hours each term 3 ①
Recommended to students interested in science or medicine. Articles in science, surgery, history of medicine, and current clinical literature are read. Consent of instructor required.

Ger 331
German Pronunciation and Phonetics
4 hours 4 ①
Fundamentals of German pronunciation. Phonology; phonetic and contrastive analysis of sounds; phonemes, intonation, and tone patterns. Supervised practice with individual use of recording equipment.

Ger 334,335,336
German Composition and Conversation
4 hours each term 4 ①
Speaking and writing the language, style and syntax, translation of modern literary texts into German, writing of original compositions. Conducted in German. Required of all German majors. Prerequisite: Ger 203 or placement.

Ger 340,341
German Culture and Civilization
4 hours each term 4 ①
German civilization with emphasis on its cultural, political, and social aspects. Recommended for all German majors. Prerequisite: Ger 203 or placement.

Ger 343,344,345
Survey of German Literature
3 hours each term 3 ①
Masterpieces of various periods through the nineteenth century. Required of German majors. Prerequisite: Ger 203 or equivalent.

Ger 360,361,362
German Drama Workshop
4 hours each term 2 ②
Practical work in the original language with a particular German drama in all aspects relevant to actual stage production, including research into the genesis of the play. Exercises in pronunciation, articulation, and communication. Will lead to production of a play. Prerequisite: Second-Year German or consent of instructor.

Ger 401 Research
Ger 402 Independent Study
Ger 403 Thesis
Ger 405 Reading and Conference (g)
Ger 407 Seminar (g)
Ger 408 Workshop (g)
Terms and hours to be arranged

Ger 409 Practicum
Terms and hours to be arranged
A supervised practicum for advanced students. Assignments as proctors or tutors in connection with lower division German language courses. No more than three hours may be used to satisfy degree requirements in German or German/modern language education.

Ger 411 German Enlightenment and Storm and Stress (g)
4 hours 2 ②
The works of Lessing, Wieland, and Herder; poetic schools; dramatic works; contribution of the writers of this age towards a new understanding of literature; literary theory and literary criticism. Prerequisite: Ger 203 or placement. Offered alternate years.

Ger 412 Die Klassik (g)
4 hours 2 ②
Goethe's and Schiller's classical period as seen in their plays, novels, poetry, and literary theory including Goethe's "Faust" and Schiller's important critical essays. Prerequisite: Ger 203 or placement. Offered alternate years.

Ger 413 Romanticism and Realism (g)
4 hours 2 ②
Individual works of nineteenth-century literature in all genres, currents of literary thought and philosophic background. Prerequisite: Ger 203 or placement. Offered alternate years.

Ger 421
Twentieth-Century German Drama (g)
5 hours. 2 ②, 1 hour to be arranged
Naturalism, neoclassicism, neoromanticism, expressionism, epic theater. Special emphasis on Hauptmann and Brecht; contemporary theater of Frisch, Dürrenmatt, Hochhuth, Weiss. Prerequisite: Ger 203 or placement. Offered alternate years.

Ger 422
Twentieth-Century German Prose (g)
5 hours 2 ②, 1 hour to be arranged
Representative German prose writers of the twentieth century with attention to literary movements and works of the major figures, particularly Mann, Kafka, Hesse, Musil. Prerequisite: Ger 203 or placement. Offered alternate years.

Ger 423
Twentieth-Century German Poetry (g)
5 hours 2 ②, 1 hour to be arranged
Readings from all major German poetry writers of the twentieth century with emphasis on the new directions they have explored during the century. Special consideration of Hofmannsthal, Rilke, Brecht, and Benn. Prerequisite: Ger 203 or placement. Offered alternate years.

ORIENTAL LANGUAGES

Chinese

Lower Division Courses

OL 50,51,52 First-Year Chinese
4 hous each term 4 ①
Essentials of colloquial Mandarin with emphasis on conversation and easy reading. Consent of instructor required.

ROMANCE LANGUAGES

French

Lower Division Courses

Fr 50,51,52 First-Year French
4 hours each term 4 ①
Pronunciation, grammar, reading, and conversation. For students with no previous training in French. Must be taken in sequence.

Fr 101,102 Second-Year French
4 hours each term 4 ①
Grammar review, composition, and reading of modern French authors; oral use of the language. Prerequisite: Fr 50,51,52 or placement. Must be taken in sequence.

Fr 199 Special Studies
Terms and hours to be arranged

Fr 201 Introductory Composition
4 hours 4 ①
Continued development of language skills. Emphasis on written expression, vocabulary expansion, and grammar review. Required of French majors. Prerequisite: Fr 102 or placement.

Fr 214 French Conversation
4 hours 4 ①
Intensive practice to improve aural comprehension and oral expression, laboratory assignments. May be taken independently of or concurrently with Fr 201. Required of French majors. Prerequisite: Fr 102 or placement.

Upper Division Courses

Courses numbered 300-399 are open to lower division students.

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Fr 311,312,313
Survey of French Literature
4 hours each term 4 ①
Selected works of major writers, literary schools, and evolution of genres from middle ages to present; conducted in French; required of French majors. Prerequisite: Fr 201 or placement.

Fr 314,315 Intermediate French Composition and Conversation
4 hours each term 4 ①
Extensive practice in speaking and writing, required of French majors. Conducted in French and must be taken in sequence. Prerequisite: Fr 201 and Fr 214 or placement.

Fr 328,329
French Culture and Civilization
4 hours each term 4 ①
Cultural life of the French people from ancient times to present as reflected in history, art, architecture, music, literature, philosophy, science, and social institutions. Conducted in French. Prerequisite: Fr 214 or placement.

Fr 331,332
French Pronunciation and Phonetics
2 hours each term 2 ①
Intensive study of French pronunciation and diction. Close phonetic analysis of French sounds, French intonation, and tone patterns. Supervised practice, with individual use of recording equipment. Prerequisite or concurrent: Fr 101, 102. Required of modern language education majors.

Fr 401 Research

Fr 402 Independent Study

Fr 403 Thesis

Fr 405 Reading and Conference (g)

Fr 407 Seminar (g)
Terms and hours to be arranged

Fr 409 Practicum
Terms and hours to be arranged
Supervised practicum for advanced students. Assignments as proctors or tutors in lower-division French language courses. No more than three hours may be used to satisfy degree requirements in French or French/modern language education.

Fr 411,412 Seventeenth-Century French Literature (g)
4 hours each term 4 ①
Fr 411: French drama and dramatic theories of the classical period. *Fr 412:* French prose, poetry, literary movements, and theories of the classical period. Conducted in French. Prerequisite: Fr 311,312,313 or equivalent. Offered alternate years.

Fr 417,418 Nineteenth-Century French Literature (g)
4 hours each term 4 ①
Representative prose, poetry, and drama of nineteenth-century French writers and literary movements. *Fr 417:* Early nineteenth century. *Fr 418:* Later nineteenth century. Conducted in French. Prerequisite: Fr 311,312,313 or equivalent. Offered alternate years.

Fr 423,424,425 Twentieth-Century French Literature (g)
4 hours each term 4 ①
Representative prose, poetry, and drama of French letters since 1900. *Fr 423:* French poetry from Baudelaire to present. *Fr 424:* Novel. *Fr 425:* Theater. Conducted in French. Prerequisite: Fr 311,312,313 or equivalent. Offered alternate years.

Fr 467,468,469 Advanced French Composition and Conversation (g)
3 hours each term 3 ①
Grammar review, vocabulary drill; oral reports and original presentations in French; analysis of writing styles and techniques; original compositions. Conducted in French. Prerequisite: Fr 315 or equivalent. Offered alternate years.

Italian

Lower Division Courses

It 70,71,72 First-Year Italian
4 hours each term 4 ①
Pronunciation, grammar, reading, and conversation.

It 104,105,106 Second-Year Italian
3 hours each term 3 ①
Grammar review, composition, and reading of modern Italian authors. Oral use of the language. Prerequisite: It 70,71,72.

It 199 Special Studies
Terms and hours to be arranged

Upper Divison Courses

It 405 Reading and Conference
Terms and hours to be arranged

Portuguese

Lower Division Courses

Port 80,81,82
First-Year Portuguese: Brazilian
4 hours each term 4 ①
Pronunciation, grammar, reading, and conversation. For students with no previous training in Portuguese.

Port 217,218,219
Directed Reading in Portuguese
2 hours each term 2 ①
To help students maintain facility in the language. Consent of instructor required.

Spanish

Lower Division Courses

Span 61,62 First-Year Spanish
5 hours each term 5 ①
Emphasizes development of comprehension and speaking skill, reading, and writing. Laboratory assignments. Must be taken in sequence.

Span 108,109 Second-Year Spanish
4 hours each term 4 ①
Further development of comprehension, speaking, reading, and writing skills; contemporary Hispanic authors; laboratory assignments. Must be taken in sequence. Prerequisite: Span 62 or placement.

Span 199 Special Studies
Terms and hours to be arranged

Span 209 Oral and Written Spanish
4 hours 4 ①
Continued development of all four language skills. Expansion of vocabulary and review of fundamental concepts of grammar. Prerequisite: Span 109 or placement.

Span 219 Spanish Conversation
4 hours 4 ①
Designed to improve facility in oral communication. Assignments in laboratory. May be taken independently or concurrently with Span 209 or Span 250. Prerequisite: Span 109 or placement.

Span 250
Introduction to Spanish Phonology
3 hours 3 ①
Supervised practice of Spanish sounds and intonation patterns with individual use of recording equipment. Also laboratory assignments. Prerequisite: Span 109 or placement.

Upper Division Courses

Courses numbered 300-399 are open to lower division students. Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Span 318,319
Introduction to Hispanic Literature
4 hours each term 4 ①
Covers literary works of Spain and Spanish America in the various genres with emphasis on internal criticism. Prerequisite: Span 209 or placement.

Span 338
Peninsular Culture and Civilization
4 hours 4 ①
Historical development and contemporary aspects of the culture of the peoples of Spain. Conducted in Spanish. Prerequisite: Span 209 or placement. Offered alternate years.

Span 340
Iberoamerican Culture and Civilization
4 hours 4 ①
The civilizations and cultures of Ibero-america. Conducted in Spanish. Prerequisite: Span 209 or placement. Offered alternate years.

Span 342,343
Survey of Spanish Literature
4 hours each term 4 ①
Literary history and readings in the drama, prose, fiction, and poetry of Spain with emphasis on the major writers. *Span 342:* Medieval, Renaissance, and Golden Age; *Span 343:* Neoclassicism to twentieth century. Required for Spanish major. Prerequisite: Span 209 or placement.

Span 344
Survey of Spanish American Literature
4 hours 4 ①
Literary history and readings with emphasis on the major Spanish-American writers from Independence to 1940. Prerequisite: Span 209 or placement. Offered alternate years.

Span 348,349 Intermediate Spanish Composition and Conversation
4 hours each term 4 ①
Review of grammar, writing of compositions, extensive practice in speaking. Required for Spanish major and must be taken in sequence. Prerequisite: Span 209 or placement.

Span 350 Advanced Spanish Phonology
3 hours 3 ①
Recognition, production, and transcription of the Spanish sound system. Emphasis on the supersegmental features, intonation, stress, juncture. Prerequisite: Span 250.

Span 401 Research

Span 402 Independent Study

Span 403 Thesis
Terms and hours to be arranged.

Span 405 Reading and Conference (g)

Span 407 Seminar (g)
Terms and hours to be arranged

Span 409 Practicum
Terms and hours to be arranged
Supervised practicum for advanced students. Assignments as proctors or tutors in lower-division Spanish language courses. Only three hours may be used to satisfy degree requirements in Spanish or Spanish/modern language education.

Span 442,443 Twentieth-Century Spanish Literature (g)
4 hours each term 4 ①
Representative Spanish prose, poetry, and drama from the Generation of 1898 to the present. Prerequisite: Span 343. Offered alternate years.

Span 445,446 Spanish-American Literature (g)
4 hours each term 4 ①
Masterpieces of the several national literatures of Spanish America, literary movements. Prerequisite: Span 209 or placement. Offered alternate years.

Span 462,463 Advanced Spanish Composition and Conversation (g)
3 hours each term 3 ①
Original compositions, debate and platform speaking in Spanish, translation of modern literary texts into Spanish. Prerequisite: Span 349 or placement. Offered alternate years.

SLAVIC LANGUAGES

Russian

Lower Division Courses

Rus 50,51,52 First-Year Russian
4 hours each term 4 ①
Pronunciation, grammar, reading, and conversation.

Rus 101,102,103 Second-Year Russian
4 hours each term 4 ①
Grammar review, composition, and reading of modern Russian authors; oral use of the language. Prerequisite: Rus 50,51,52.

Rus 111,112,113 Russian Conversation
2 hours each term 2 ①
Intensive course at the second-year level. Taken independently of or concurrently with Rus 101, 102,103. Prerequisite: Rus 50,51,52.

Rus 199 Special Studies
Terms and hours to be arranged

Upper Division Courses

Courses numbered 300-399 are open to lower division students.

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Rus 311,312,313 Survey of Russian Literature
3 hours each term 3 ①
Masterpieces of various periods, particularly the nineteenth and twentieth centuries. Prerequisite: Rus 101,102.103.

Rus 314,315,316 Intermediate Russian Composition and Conversation
3 hours each term 3 ①
Extensive practice in speaking and writing the language. Conducted in Russian. Prerequisite: Rus 101,102,103; Rus 111,112,113.

Rus 317,318,319 Directed Reading in Russian
2 hours each term 2 ①
Supervised intensive reading in selected Russian texts to develop reading and comprehension skills. Recommended as a preliterature course. Prerequisite: two years of college Russian or equivalent.

Rus 320,321,322 Scientific Russian
3 hours each term 3 ①
Provides opportunity to study beyond second year and to read in various fields of science.

Rus 330 Russian Pronunciation and Phonetics
3 hours 3 ①
Fundamentals of Russian pronunciation and diction; close phonetic analysis of Russian sounds, Russian intonation, and tone patterns. Supervised practice, with individual use of recording equipment.

Rus 401 Research
Rus 402 Independent Study
Rus 403 Thesis
Rus 405 Reading and Conference (g)
Rus 407 Seminar (g)
Terms and hours to be arranged

Rus 409 Practicum
Terms and hours to be arranged
Supervised practicum for advanced students. Assignments as proctors or tutors in lower-division Russian language courses. Only three hours may be used to satisfy degree requirements in Russian or Russian/modern language education.

Rus 411 Nineteenth-Century Russian Literature
(g) 3 hours 3 ①
Tsarist Russia as portrayed in Russian literature. Conducted in English.

Rus 412 Tolstoy, Dostoyevsky, and Chekhov
(g) 3 hours 3 ①
Reading, discussion, and analysis of the novels and short stories of Tolstoy, Dostoyevsky, and Chekhov. Conducted in English.

Rus 413 Contemporary Soviet Literature (g)
3 hours 3 ①
Contemporary Soviet Russia as portrayed in Soviet literature. Conducted in English.

Rus 421,422,423 Modern Russian Literature (g)
3 hours each term 3 ①
Major artistic figures in short story, drama, and poetry with close textual analysis of each work. Prerequisite: three years of college Russian.

Rus 461,462,463 Advanced Russian Composition and Conversation
3 hours each term 3 ①
Review of grammar, oral reports, translation of modern literary texts into Russian, writing of original compositions. Conducted in Russian. Prerequisite: Rus 316.

RS 127,128 Introduction to Russian Culture
See RUSSIAN STUDIES

LINGUISTICS

Lower Division Courses

ML 199 Special Studies
Terms and hours to be arranged

Upper Division Courses

ML 401 Research
ML 402 Independent Study
ML 403 Thesis
ML 405 Reading and Conference (g)
ML 407 Seminar (g)
ML 408 Workshop
Terms and hours to be arranged.

ML 451 General Linguistics
3 hours 3 ①
Language systems; comparative philology; historical, descriptive, and structural linguistics; semantics; phonetics and phonemics. Prerequisite: 9 hours upper division French, German, or Spanish.

ML 452 Romance Linguistics
3 hours 3 ①
Evolution and development, comparative phonology and morphology. Prerequisite: ML 451; 9 hours upper division Romance languages.

ML 453 Germanic Linguistics
3 hours 3 ①
Evolution and development; comparative and structural linguistics, especially German and English; phonology and morphology. Prerequisite: ML 451; 9 hours upper division Germanic languages.

FOREIGN STUDY PROGRAMS

Courses listed in the foregoing Modern Languages sections are available also to students studying at overseas study centers sponsored by the Oregon State System of Higher Education and administered by Oregon State University (see pp. 31-32) when corresponding courses may be identified at the universities where these centers are located. Courses listed below (designated with *F* suffixed to the course number) may be taken only at the overseas study centers.

French Study Center

University of Poitiers, France

Fr 114,115,116F French Conversation
2 hours each term 2 ①

Fr 307,308,309F Directed Reading in French 2 hours each term 2 ①

Fr 314,315,316F Intermediate French Composition and Conversation
3 hours each term 3 ①

Fr 328,329,330F French Culture and Civilization 3 hours each term 3 ①

Fr 411,412,413F Seventeenth-Century French Literature (g)
3 hours each term 3 ①

Fr 417,418,419F Nineteenth-Century French Literature (g)
3 hours each term 3 ①

Fr 423,424,425F Twentieth-Century French Literature (g)
3 hours each term 3 ①

Fr 467,468,469F Advanced French Composition and Conversation (g)
2 hours each term 2 ①

German Study Center

University of Stuttgart, Germany

Ger 111,112,113F German Conversation
2 hours each term 2 ①

Ger 311,312,313F Directed Reading in German
2 or 3 hours each term 2 or 3 ①

Ger 320,321,322F Scientific German
2 or 3 hours each term 2 or 3 ①

Ger 331,332,333F German Pronunciation and Phonetics
3 hours each term 3 ①

Ger 334,335,336F Intermediate German Composition and Conversation
2 or 3 hours each term 2 or 3 ①

Ger 411,412,413F Age of Goethe (g)
3 hours each term 3 ①

Ger 414,415F The German Novel (g)
3 hours each term 3 ①

Ger 416F The German Novelle (g)
3 hours 3 ①

Ger 417,418,419F German Drama (g)
3 hours each term 3 ①

Ger 421,422,423F German Literature of the Twentieth Century (g)
3 hours each term 3 ①

Ger 424,425,426F Advanced German Composition and Conversation
2 or 3 hours each term 2 or 3 ①

Ger 427,428,429F German Romanticism (g) 3 hours each term 3 ①

Ger 430,431,432F German Poetry (g)
3 hours each term 3 ①

Japan Study Center
Waseda University, Tokyo

OL 60,61,62F First-Year Japanese
7 hours each term
4 (1½) 10 ① 4 (1½)

OL 104,105,106F Second-Year Japanese 7 hours each term
4 (1½) 10 ① 4 (1½)
Prerequisite: OL 62F.

OL 314,315,316F Third-Year Japanese 7 hours each term
4 (1½) 10 ① 4 (1½)
Prerequisite: OL 106F.

OL 414,415,416F Advanced Japanese
7 hours each term
4 (1½) 10 ① 4 (1½)
Prerequisite: OL 316F

European Studies Center, Stockholm

Sw 70,71F First-Year Swedish
5 hours each, summer 5 ①
Elementary course in the Swedish language. Fundamentals of grammar, with particular attention to the spoken language. Composition and reading also included in the course.

Various Overseas Study Centers

ML 450F Language and Language Learning 5 hours 2 (2½)
Introduction to linguistics, the universals of language, and the nature of language learning.

MUSIC

The Department of Music offers a major program leading to the B.A. or B.S. degree with areas of concentration in applied music, music history and literature, and theory and composition. In cooperation with the School of Education it offers a curriculum leading to the completion of the Basic Norm for teaching music on the secondary school level, and a music concentration on the elementary school level. See SCHOOL OF EDUCATION.

All courses are open to all students in the university who meet the prerequisites; Mus 101,201,202,203, and 249 are specifically designed for the nonmusic major.

Freshmen and transfer students considering music as a major or concentration field should register for Mus 111,112, 113 and consult with the chairman as early as possible to make tentative plans for a suitable program in accordance with abilities and previous training. Students who fail to pass an entrance examination in keyboard skills should register for Mus 182, Functional Piano, no later than the second term of the freshman year.

Departmental requirements at the lower division level are: Rudiments and Music Theory (Mus 111,112,113; 211, 212,213; 214,215,216). Introduction to Music and its Literature (Mus 221,222, 223), 6 hours of applied music, and 3 hours in musical organizations.

Upper division requirements are: History of Music (Mus 361,362,363), 12 hours of music requirements for the specific concentration, musical organizations, 10 hours of electives in music, and a recital or research project.

Prerequisite for admission to the major are: (1) successful completion of the entrance keyboard requirement, either by examination or completion of Mus 182, (2) Mus 113 with a minimum grade of C in each part of the final examination (including sight-singing and keyboard proficiency), (3) 3 hours of applied music, and (4) passing with a minimum score of 60 each of three listening examinations in basic music repertoire.

All music and music education majors are required to pass a keyboard proficiency examination prior to the completion of the 8th week of the junior year, and to attend a specified number of concerts and recitals per term. Concert attendance is also required of non-music majors who are enrolled in selected courses.

Musical Organizations. Choral and instrumental ensembles, open to all students in the university by audition, are rehearsed and conducted by members of the department staff. Interested students should apply for membership at the Music Department office or contact the conductor of the ensemble in which they are interested. Announcements for auditions for all organizations are made at the beginning of fall term.

Participation in organizations and ensembles is considered indispensible in the training of a musician. In the interests of a well-rounded experience, students should not confine themselves exclusively to either large organizations or chamber ensembles, but should participate in both (not necessarily at the same time). Switching from one group to another in mid-year is discouraged.

Library. A large collection of books on music is housed in the education and fine arts section of Kerr Library. Listening facilities including records and scores are located in the Benton Hall Music Learning Center.

Applied Music. Private lessons in organ and instruments of the band and orchestra, and private and class lessons in piano and voice carry one hour of credit for one half-hour lesson per week. All fees for private lessons must be paid in advance at the Business Office. No deduction is made for lessons missed by the student nor will such lessons be made up except in the case of serious illness. All students will be charged for one hour of daily practice per credit hour of applied music. Practice fees are used for upkeep of rooms and instruments, including pianos in instructors' studios. Students are expected to practice in rooms provided. No reduction in fees will be granted to those students who prefer to practice at home.

	Per term
APPLIED MUSIC (private lessons):	
Piano, Voice, Organ, Strings, Winds, and Percussion	
One lesson a week, one-half hour (1 term hour of credit)	$30.00
Two lessons a week, one-half hour each (2 term hours of credit)	$50.00
PRACTICE ROOM RENTAL—with piano:	
One hour a day, per term	$ 5.00
Two hours a day, per term	$ 9.00
Three hours a day, per term	$12.00
PRACTICE ROOM RENTAL—without piano:	
One hour a day, per term	$ 3.00
Two hours a day, per term	$ 6.00
Three hours a day, per term	$ 9.00
ORGAN RENTAL:	
One hour per day, per term	$10.00

Music majors may apply for waiver of applied music fee upon completion of Music 112 and 113, or the equivalent.

Certain scholarships in applied music are available to all interested students. See section on SCHOLARSHIPS.

Students should consult the departmental office regarding regulations governing registration, attendance, public performance of music students, etc.

Lower Division Courses

Mus 101 Basic Musicianship
3 hours 3 ①
Fundamentals of music for the nonmajor. Music reading, simple chord structures, use of harmonic instruments.

Mus 111 Rudiments of Music
4 hours 5 ①
Music fundamentals, scales, key relationships, intervals, triads, with emphasis on ear training, sightsinging, and keyboard. Ability to read music advisable.

Mus 112,113 Music Theory I
4 hours each term 5 ①
Harmonization of various triads and seventh chords in all positions, nonchord tones, free harmonization, and simple modulation; keyboard work, chord recognition, sight singing, and analysis correlated with written work. Prerequisite: Mus 111.

Mus 181 Class Lessons in Voice
1 hour any term, three terms 1 ①
Elementary instruction for beginners. Special fee. Consent of instructor required.

Mus 182 Functional Piano
1 hour any term, three terms 1 ①
Elementary group instruction to improve general musicianship through keyboard study. Special fee. Consent of instructor required.

***Mus 183**
Chamber Ensemble: Madrigal Singers
1 hour any term, six terms 3 ①
Study and performance of early and contemporary madrigal literature. Prerequisite: audition.

***Mus 184 Chamber Ensemble: String**
1 hour any term, six terms 1 ①
Performance of chamber music for string instruments. Prerequisite: audition.

***Mus 185**
Chamber Ensemble: Woodwind
1 hour any term, six terms 1 ①
Performance of chamber music for woodwind instruments. Prerequisite: audition.

***Mus 186 Chamber Ensemble: Brass**
1 hour each term, six terms 1 ①
Performance of chamber music for brass instruments. Prerequisite: audition.

***Mus 187**
Chamber Ensemble: Percussion
1 hour each term, six terms 1 ①
Performance of chamber music for percussion instruments. Prerequisite: audition.

***Mus 188**
Chamber Ensemble: Miscellaneous
1 hour each term, six terms 1 ①
Performance of chamber music for mixed instrumental and vocal ensembles.

Mus 190 Applied Music
1 or 2 hours each term, three terms
Individual instruction in piano, organ, voice, and instruments of band and orchestra. Term hours on basis of number of lessons per week (one or two half-hour periods). Attendance at class sessions and recitals required. Special fee. Consent of instructor required.

Mus 195 Marching Band
2 hours fall, two terms 3 ① 1 ②
Open to men and women by audition.

Mus 196 Symphonic Band
1 hour winter and spring, 4 terms
2 ① 1 ②
Concert Band and Varsity Band. Open to men and women by audition.

Mus 197 Chorus: University Chorus
1 hour each term six terms 3 ①
Open to all students by audition. Limited to 80 members.

Mus 197 Chorus: Choralaires.
1 hour each term, six terms 3 ①
Open to all students by audition. Concert choir, limited to 60 members.

Mus 198 Orchestra: University Symphony Orchestra
1 hour each term, six terms 1 ② 1 ①
Open to all students by consent of conductor.

Mus 199 Chamber Orchestra
1 hour each term, six terms 1 ② 1 ①
A select ensemble of 35-40 players; performances of works for small orchestra from the sixteenth century to the present day. Open to all students by consent of conductor.

Mus 201 Music Appreciation
3 hours 3 ①
For nonmajors. Fundamental concepts introduced through studies of repertory and thorough analysis of selected masterworks.

Mus 202 Survey of Music History
3 hours 3 ①
For nonmajors. The development of western music from the middle ages to the present. Prerequisite: Mus 201.

* A maximum of 6 hours of credit may be earned in Mus 183-188.

Mus 203 Great Composers
3 hours 3 ①
For nonmajors. A study of the life and works of one or several related great composers (Bach, Mozart, Brahms, etc.—see *Schedule of Classes*). Prerequisite: Mus 201 or 113. Course may be repeated for credit.

Mus 204 Folk Music in America
3 hours 3 ①
Definitions, concepts, social contexts, and analysis of European, African, and American Indian folk music traditions in the United States.

Mus 211,212,213 Music Theory II
3 hours each term 3 ①
A continuation of the harmonic materials of music with emphasis on chromatic harmony, advanced modulation, and style. An integrated course including written work, analysis, and aural comprehension. Prerequisite: Mus 113.

Mus 214,215,216 Keyboard Harmony
1 hour each term 1 ①
Keyboard application of harmonic principles being studied concurrently in Music Theory II; exercises in diatonic and chromatic harmony, modulation, figured bass realization, transposition and improvisation. Prerequisite: Mus 113 or equivalent. Required of all music majors and specialists in music education.

Mus 221,222,223
Introduction to Music and its Literature
3 hours each term 3 ①
Music from the eighteenth century to the present is studied to acquire a broad knowledge of repertory and thorough familiarity with musical structures, genres, and procedures. Prerequisite: Mus 113.

Mus 249 Master Works of Orchestra
3 hours 3 ①
For nonmajors. Orchestral music from the Baroque period to the present; emphasis on standard repertoire. Prerequisite: Mus 201.

Mus 290 Applied Music
1 or 2 hours each term, three terms
Continuation of 190 on a more advanced level. Prerequisite: 3 hours of Mus 190 or 181-182.

Upper Division Courses
Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Mus 311,312,313 Counterpoint
2 hours each term 2 ①
Study, through analysis and writing, of the basic contrapuntal principles of the sixteenth, eighteenth, and twentieth centuries. Prerequisite: Mus 213 or equivalent.

Mus 323 Conducting
2 hours 2 ①
Basic baton techniques. Prerequisite: Mus 113.

Mus 324,325 Choral Conducting
2 hours each term 2 ①
Advanced baton techniques, score reading; principles of developing choral excellence. Practical experience conducting campus organizations. Prerequisite: Mus 323.

Mus 326,327 Instrumental Conducting
2 hours each term 2 ①
Advanced baton techniques, score reading, principles of developing band and orchestra excellence. Practical experience conducting campus organization. Prerequisite: Mus 323.

Mus 361,362,363 History of Music
3 hours each term 3 ①
Survey of musical forms and styles from Gregorian chant to present. Prerequisite: Mus 223.

Mus 371
Music for Elementary Teachers
4 hours 5 ①
Music activities for elementary teachers in training. Introductory course designed to build basic musicianship through experiences that apply to teaching of music in elementary classroom.

Mus 372
Music for Elementary Teachers
3 hours 5 ①
Experiences in teaching the various music activities found in the elementary school. Prerequisite: Mus 371.

Mus 373 Teaching of Music: Elementary and Junior High School
3 hours 3 ①
Curriculum planning and new approaches to music, grades K through 9. Prerequisite: Mus 113.

***Mus 383**
Chamber Ensemble: Madrigal Singers
1 hour each term, six terms 3 ①
Prerequisite: any six terms of Mus 183-188.

***Mus 384 Chamber Ensemble: String**
1 hour any term, six terms 1 ①
Prerequisite: any six terms of Mus 183-188.

***Mus 385**
Chamber Ensemble: Woodwind
1 hour any term, six terms 1 ①
Prerequisite: any six terms of Mus 183-188.

***Mus 386 Chamber Ensemble: Brass**
1 hour any term six terms 1 ①
Prerequisite: any six terms of Mus 183-188.

***Mus 387 Chamber Ensemble: Percussion**
1 hour any term, six terms 1 ①
Prerequisite: any six terms of Mus 183-188.

***Mus 388**
Chamber Ensemble: Miscellaneous
1 hour any term, six terms 1 ①
Prerequisite: any six terms of Mus 183-188.

Mus 390 Applied Music
1 or 2 hours any term three terms
Continuation of 290 on a more advanced level. Prerequisite: qualifying examination.

Mus 391
Instrumental Techniques: Strings
2 hours 2 ①
Basic instruction in stringed instruments. For music majors and specialists in music education.

Mus 392
Instrumental Techniques: Woodwinds
2 hours 2 ①
Basic instruction in woodwind instruments. For music majors and specialists in music education.

Mus 393
Instrumental Techniques: Brass
2 hours 2 ①
Basic instruction in brass instruments. For music majors and specialists in music education.

Mus 394
Instrumental Techniques: Percussion
2 hours 2 ①
Basic instruction in percussion instruments. For music majors and specialists in music education.

Mus 395 Marching Band
2 hours fall, two terms 3 ① 1 ②
Prerequisite: two terms of Mus 195.

Mus 396 Symphonic Band
1 hour winter and spring, four terms 3 ①
Prerequisite: four terms of Mus 196.

Mus 397 Chorus: University Chorus
1 hour each term, six terms 3 ①
Prerequisite: six terms of Mus 197.

* A maximum of 6 hours of credit may be earned in Mus 383-388.

Mus 397 Chorus: Choralaires
1 hour each term, six terms 3 ①
Prerequisite: six terms of Mus 197.

Mus 398 Orchestra: University Symphony Orchestra
1 hour each term, six terms 1 ② 1 ①
Prerequisite: six terms of Mus 198.

Mus 399 Chamber Orchestra
1 hour each term, six terms 1 ② 1 ①
Prerequisite: six terms of Mus 199.

Mus 401 Research

Mus 402 Independent Study

Mus 403 Thesis

Mus 405 Reading and Conference (g)

Mus 406 Projects (g)
Terms and hours to be arranged

Mus 407 Seminar (g)
Terms and hours to be arranged
See *Schedule of Classes* for specific topics.

Mus 408 Workshop (g)
Terms and hours to be arranged

Ed 407 Seminar
3 hours 3 ①
See SCHOOL OF EDUCATION

Ed 408o Special Secondary Methods
3 hours
See SCHOOL OF EDUCATION

Mus 411 Choral Arranging (g)
3 hours 3 ①
Arranging for choral organizations, including special problems in writing for younger choruses. Prerequisite: Mus 213. Offered alternate years.

Mus 414 Band Arranging (g)
3 hours 3 ①
Ranges and capabilities of instruments; principles of scoring for concert band, marching band, and smaller combinations of instruments. Prerequisite: Mus 213. Offered alternate years.

Ed 416o Student Teaching: Secondary
9 to 15 hours
See SCHOOL OF EDUCATION

Mus 417 Orchestration (g)
3 hours 3 ①
Ranges and capabilities of instruments, principles of scoring for modern symphony orchestra, problems of writing for younger orchestras. Prerequisite: Mus 213. Offered alternate years.

Mus 421 Composition I (g)
3 hours 3 ①
Principles of melodic construction and musical design. Written work in small forms and conventional tonal idioms. Prerequisite: Mus 213. Offered alternate years.

Mus 422 Composition II (g)
3 hours 3 ①
Written work in larger forms; techniques of twentieth-century composition. Prerequisite: Mus 421. Offered alternate years.

Mus 431 Studies in Musical Analysis
(g) 3 hours 3 ①
The relationship of analysis to performance, unusual approaches to analysis, the relation of musical form to emotional expression, aesthetics. Emphasis on individual reports by students. Prerequisite: Mus 223. Offered alternate years.

Mus 441,442,443 Advanced Conducting
(g) 3 hours each term 3 ①
Advanced techniques of conducting—both choral and instrumental. Baton technique, interpretation, study of major scores. Prerequisite: Mus 325 or 327.

Mus 444
Choral Literature for Public Schools
(g) 3 hours 3 ①
Repertory of choral groups in secondary schools; literature for girls' and boys' glee clubs and the mixed choir, analysis and performance in class, program planning. Prerequisite: Mus 325 or equivalent. Offered alternate years.

Mus 447 Vocal Literature (g)
3 hours 3 ①
Solo vocal literature from the Renaissance to the present. Prerequisite: Mus 223. Offered alternate years.

Mus 448 Keyboard Literature (g)
3 hours 3 ①
Study of representative literature of selected master composers from the pre-Bach period to the present with illustrative performances by students and faculty. Prerequisite: Mus 223. Offered alternate years.

Mus 449 Orchestral Literature (g)
3 hours 3 ①
Survey of orchestral music from the Baroque period to the present with emphasis on standard repertoire. Prerequisite: Mus 223. Offered alternate years.

Mus 450
Music of the Twentieth Century
3 hours 3 ①
Important trends in music since 1910, major composers and their works. Prerequisite: Mus 223. Offered alternate years.

Mus 453 The Opera (g)
3 hours 3 ①
Composers, libretti, and styles with emphasis on current operatic repertoire, assigned reading and listening. Prerequisite: Mus 223. Offered alternate years.

Mus 461 Chamber Music Literature
(g) 3 hours 3 ①
Chamber music from Haydn to present with emphasis on music in the standard literature. Prerequisite: Mus 223. Offered alternate years.

Mus 490 Applied Music
1 or 2 hours each term, three terms
Continuation of 390 on a more advanced level. Prerequisite: 3 hours of Mus 390.

Foreign Study Programs

The courses listed below (specially designated with *F* suffixed to the course number) are available for foreign summer concert tour only. Preregistration is required.

Mus 197F Chorus: Choralaires
3 hours summer

Mus 397F Chorus: Choralaires
3 hours summer

PHILOSOPHY

The Department of Philosophy offers a major program leading to the B.A. or B.S. degree. It also provides courses for the general student to broaden his intellectual and cultural horizons, develop his abilities for intelligent criticism, and enlarge his understanding of the moral and aesthetic values in contemporary society.

The major program provides preparation for advanced study in law, theology, journalism, and public service or for graduate study in historic and contemporary philosophy. A double major, combining a concentration in either the arts and literature, the natural sciences, or the social sciences with philosophy, is encouraged.

An Honors Program is available for students who qualify.

Departmental requirements:

	Hours
History of philosophy	12
Contemporary philosophy	12
Upper division ethics	4
Symbolic logic	4
Seminar	3
Electives in philosophy	10
	45

Lower Division Courses

Phl 100 Introduction to Philosophy
4 hours 3 ① 1 ①
For the general student. Major philosophical theories of reality, problems of knowledge and value, the nature and employment of philsophical analysis.

Phl 199 Special Studies
Terms and hours to be arranged

Phl 121 Critical Thinking
4 hours 3 ① 1 ①
Problem solving, recognition and analysis of arguments, basic patterns of reasoning, and common fallacies. Intended to develop an understanding of logical analysis and criticism.

Phl 201 Problems of Philosophy
4 hours 3 ① 1 ①
The views of some representative philosophers, or some of the important problems and analytical methods of philosophy.

Phl 205 Ethics
4 hours 3 ① 1 ①
Philosophical analysis of ethical issues, standards, and concepts. Prerequisite: Phl 100 or 121 recommended.

Phl 207 Political Philosophy
4 hours 3 ① 1 ①
Basic political theories and concepts, philosophical analysis of social issues. Prerequisite: Phl 100 or 121 recommended.

Phl 221 Symbolic Logic
4 hours 3 ① 1 ①
Deductive reasoning and semantics studied through the design of formal languages and rules for their manipulation, elementary properties of formal languages; Applicable to reasoning in many fields, especially the sciences, mathematics, philosophy, or law.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (*G*) may be taken for graduate credit.

Phl 301,302,303
History of Western Philosophy
4 hours each term 3 ① 1 ①
301: Greek and Roman philosophy. *302:* Medieval and Early Modern Philosophy. *303:* Modern Philosophy. Prerequisite: Phl 100 or 121 recommended.

Phl 308 Survey of Asian Philosophy
4 hours 4 ①
Traditional and contemporary philosophies of India, China, and Japan and their significance for Western man. Phl 100 or 121 recommended.

Phl 311,312,313
Great Figures in Philosophy
4 hours each term 3 ① 1 ①
The works of major philosophers such as Plato, Aristotle, Descartes, Hume, and Kant. Prerequisite: Phl 100 or 121 and Phl 301,302,303 recommended.

Phl 315
History of American Philosophy
4 hours 3 ① 1 ①
American philosophical movements from the Puritan period to recent times. Prerequisite: Phl 100 or 121 recommended.

Phl 321 Set Theory
4 hours 3 ① 1 ①
The theory of sets, paradoxes, algebra of sets, concepts in mathematics and science, transfinite numbers. Relation of set theory to semantics. Prerequisite: Phl 221 or consent of instructor.

Phl 331,332,333
Contemporary Philosophy
4 hours each term 3 ① 1 ①
331: Revolt against idealism: G. E. Moore and Bertrand Russell. *332:* Contemporary trends in empiricism and linguistic analysis. *333:* Phenomenology and existential philosophy. Prerequisite: Phl 100 or 121 and Phl 303 recommended.

Phl 341 Classical Ethical Theories
4 hours 3 ① 1 ①
Philosophical issues in ethics analyzed through the examination of such classical works as Aristotle's *Nicomachean Ethics.* Prerequisite: Phl 205.

CS 341 Logic and Boolean Algebra
3 hours 3 ①
See COMPUTER SCIENCE for course description.

Phl 342 Contemporary Ethics
4 hours 3 ① 1 ①
Significant developments in twentieth-century moral philosophy. Prerequisite: Phl 205. Offered alternate years.

Phl 348 Philosophy of Religion
4 hours 3 ① 1 ①
Religious concepts of reality and human nature, ideas of God, problems of faith and reason, religious language and symbolism, religious concepts of man and history. Prerequisite: Phl 100 or 121 recommended.

Phl 351 Theory of Knowledge
4 hours 3 ① 1 ①
Significant theories concerning knowledge; analysis of important concepts and problems including rationalism, empiricism, skepticism, perception, induction, belief, etc. Prerequisite: Phl 100 or 121 recommended.

Phl 360 Philosophy of Art
4 hours 3 ① 1 ①
Aesthetic theories and concepts, philosophical analysis of issues in criticism and the field of art. Prerequisite: Phl 100 or 121 recommended.

Phl 370 Philosophy of Language
4 hours 4 ①
Historic contributions of philosophers such as Augustine, Locke, and Russell to the study of language; analysis of speech acts; contributions of formalists such as Quine and Chomsky. Prerequisite: Phl 100 or 121 recommended.

Phl 402 Independent Study

Phl 405 Reading and Conference (g)

Phl 407 Seminar (g)
Terms and hours to be arranged

Phl 421 Advanced Logic (g)
4 hours 3 ① 1 ①
Mathematical techniques in the analysis of reasoning; axiom systems; first order logics; metatheory and model theory; completeness and incompleteness, decidability; philosophical relevance of these results to science and mathematics. Prerequisite: Phl 321.

Phl 431
Topics in Contemporary Philosophy (g)
4 hours 3 ① 1 ①
Intensive examination of the work of a specific contemporary philosopher or of a specific contemporary philosophical problem; e.g., Wittgenstein, Moore, determinism, perception, and others. Prerequisite: 6 hours upper division philosophy.

Phl 446 Philosophy of Education (G)
4 hours 4 ①
Current philosophical methods in application to educational problems. Phl 100 or 121 recommended.

Phl 470,471 Philosophy of Science (g)
4 hours each term 4 ①
Nature and structure of scientific concepts, theories, and laws; revolutions in science and their causes; influences of science and philosophy on each other. Prerequisite: upper division standing in science or Phl 221.

Phl 475 Philosophy of Mathematics
(g) 4 hours 3 ① 1 ①
Philosophical analysis of mathematics; its nature, fundamental concepts, and foundations; significant writings. Prerequisite: Phl 321.

Mth 494 Fundamentals of Elementary Mathematics (g)
3 hours 3 ①
See MATHEMATICS for course description.

POLITICAL SCIENCE

The Department of Political Science offers a major program leading to the B.A. or B.S. degree as preparation for professional and specialized careers. It provides for the non-major student a systematic understanding of political life.

The major program provides preparation for entry directly, or after graduate work, into careers in law, foreign service, management of government programs at all levels, politics, international organizations, university teaching, research, and others.

Majors are urged to consult with their advisers in designing a program that best serves their educational and career objectives. Students interested in high school teaching may take programs that fulfill state certification requirements.

Majors must complete 45 hours in Political Science, including PS 101 and at least 32 upper division hours. With the prior approval of the major adviser, not more than 8 hours of course work relating specifically to the student's major program may be selected from fields other than Political Science.

Lower Division Courses

PS 101 Introduction to Modern Politics
5 hours 5 ①
Modern political systems; ideas, institutions, leadership, patterns of stability, change, and development from selected western and non-western polities. Topics ranging from primitive to post-nation-state styles of political behavior.

PS 199 Special Studies
Terms and hours to be arranged

PS 201 American National Government
5 hours 5 ①
American constitutional system, political process, and organization of national government.

PS 203 American State and Local Governments
5 hours 5 ①
Position, organization, and functions of American governments at the state and local levels, as well as contemporary problems and trends. Prerequisite: PS 201.

PS 205 International Relations
5 hours 5 ①
Nature of the international system and analysis of factors affecting the international environment.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

PS 309 Legislative Politics
3 hours 3 ①
Role and functions of legislator and legislative bodies and their vital position in a political system predicated upon the principle of popular sovereignty. Prerequisite: PS 203.

PS 310 Presidential Politics
3 hours 3 ①
Office, powers, and politics of the American Presidency, with reference to other executive offices in American government; emphasis on the Presidency as of centripetal importance and effect in American politics. Prerequisite: PS 201.

PS 311 Introduction to Political Analysis
5 hours 5 ①
For political science majors and other social science students interested in the theoretical problems of political analysis. Analyses of selected theoretical writings, concepts, and methodology, stressing various approaches to the study of politics. Prerequisite: PS 101 or 201.

PS 313 State Governments and Politics
3 hours 3 ①
Importance of states in total governmental process; functions, including education, welfare, law enforcement, protection of natural resources, and regulation of business and labor; roles of individual citizens, pressure groups, political leaders, administrators, and legislators in shaping state government. Prerequisite: PS 203.

PS 317,318,319
American Constitutional Law
5 hours each term 5 ①
PS 317: The judical process; powers of the courts, Congress, and President; nation-state relationship. *PS 318:* National powers, with emphasis upon commerce, tax, war, and treaty powers. *PS 319:* Civil liberties; civil, political, and social rights of individuals. Prerequisite: PS 201.

PS 325 American Political Process
5 hours 5 ①
Political parties and elections, the electorate and voting behavior, electoral system, exercise of the suffrage, extent and consequences of voter participation. Prerequisite: PS 201.

PS 326 Pressure Groups
3 hours 3 ①
Nature, sources, strategy, and tactics of group power; ramifications for a democratic society. Prerequisite: 10 hours of political science.

PS 328 Ethnic Politics in America
5 hours 5 ①
Traditional and contemporary patterns of ethnic group identification, involvement, and impact in American politics; political action and public policy affecting and involving ethnic groups such as Afro-Americans, American Indians, and Mexican-Americans. Prerequisite: PS 201.

PS 330 Government and Politics of Asia: China, Japan, and Korea
5 hours 5 ①
Prerequisite: PS 101 or PS 201.

PS 331 Government and Politics of Asia: Southeast Asia
5 hours 5 ①
Prerequisite: PS 101 or PS 201.

PS 332 Government and Politics of South Asia
3 hours 3 ①
Prerequisite: PS 101 or PS 201.

PS 334 Public Policy Problems
5 hours 5 ①
The substantive content, administrative problems, and political strategies in such areas and national programs as poverty and welfare, race and rights, jobs and automation technology, defense and foreign affairs. Prerequisite: PS 201.

PS 335,336 Current Problems in American Democracy
2 hours each term 2 ①
Domestic and foreign policy, organization and operation of American political system, individual and state in democractic society.

PS 344
Political Systems of Western Europe
5 hours 5 ①
Comparative analysis of contemporary institutions of governmental power in Western Europe; political tradition, process, stability and change, subsystems of leadership, political integration, and interest formation. Prerequisite: PS 101.

PS 346 The Soviet Political System
5 hours 5 ①
Background, formation, and development of the Soviet political system; the sources, problems, and patterns of political power in the USSR today. Prerequisite: PS 101.

PS 350 Classical Political Thought
5 hours 5 ①
Major political theorists from the pre-Socratics through the Scholastics.

PS 351 Modern Political Thought
5 hours 5 ①
Major political theorists from the Renaissance to the mid-nineteenth century.

PS 360 Government and Politics of Latin America
5 hours 5 ①
Basic institutional arrangements; major pressure groups, political parties, the military, and possibilities for revolution and/or reform.

PS 402 Independent Study

PS 403 Thesis

PS 405 Reading and Conference (g)

PS 406 Projects (g)

PS 407 Seminar (g)
Terms and hours to be arranged

PS 410 Political Science Internship
(g) 1 to 12 hours
Supervised work experience in government programs or other public affairs organizations. Supplementary training conference, reports, and appraisals. May be repeated for a maximum of 12 hours.

PS 411,412 Public Administration (g)
3 or 4 hours each term 3 ①, 4 ①
PS 411: principles of public administration, administrative organization and procedures, public relations. *PS 412:* administrative functions, public personnel, and fiscal problems and practices. Prerequisite: PS 201.

PS 413 Problems and Issues in Public Administration (g)
3 hours 3 ①
Individual and group behavior in an administrative environment; change and adaptation, the administrator and policy development, reorganization, organizational research, application to current problems. Prerequisite: PS 201,411,412.

PS 417
Concepts of International Relations (g)
3 hours 3 ①
Basic theories and approaches to international relations. Prerequisite: PS 205.

PS 418 American Foreign Policy (g)
3 hours 3 ①
Principles, purposes, processes of policy-making; an analysis and evaluation of procedural and substantive aspects of American foreign policy. Prerequisite: PS 201 or 205.

PS 419 International Relations of Asia
(g) 3 hours 3 ①
Selected foreign policies of Asian states, relations with each other and with the world community, with special reference to U. S. interests and policies. Prerequisite: PS 205 and one of the following: PS 330,331,332, or 417.

PS 420 International Organization (g)
3 hours 3 ①
Interstate interaction and organization; historical, legal, structural, and theoretical analysis; the United Nations system. Prerequisite: PS 417.

PS 422 International Law (g)
3 hours 3 ①
Theories and historical development of international law, problems in development, classic cases. Prerequisite: PS 417.

PS 423 Municipal Government (g)
3 hours spring 3 ①
Organization, functions, and problems of city governments. Prerequisite: PS 203.

PS 428
Psychological Dimensions of Politics (g)
4 hours fall 4 ①
Psychological bases, including needs and drives affecting political behavior, learning and political socialization, and rationality in politics. Prerequisite: PS 101.

PS 429 Political Behavior (g)
5 hours 5 ①
Individual and group aspects; social and psychological factors in politics; consideration of available research on voting behavior, ideology, extreme belief and affiliation, leadership; participation, personality factors, public opinion, and group influences. Prerequisite: PS 325,326.

PS 433 American Political Thought
(g) 5 hours 5 ①
Political values and theoretical systems in the American tradition. Prerequisite: PS 201; junior standing.

PS 438 Soviet Foreign Policy (g)
3 hours 3 ①
Principles, background, evolution, and processes of Soviet foreign policy, aspects of change and continuity in major areas of policy and doctrine. Prerequisite: PS 346 or Hst 448, Hst 450.

PS 443
Problems of International Relations (g)
3 hours 3 ①
Systematic treatment of selected problems and aspects of international relations. Prerequisite: PS 417.

PS 463 Contemporary Problems in Latin America (g)
4 hours 4 ①
Latin-American political issues and their consequences; problems involving law, order, justice, authority, and legitimacy. Prerequisite: PS 360.

PS 464 Problems and Issues of Contemporary Political Thought (g)
4 hours 4 ①
Major issues arising out of the philosophy of the nineteenth and twentieth centuries, political "isms" of modern world. Prerequisite: PS 351.

PS 480 Administrative Law (g)
4 hours 4 ①
Basic administrative law; control of administrative agencies, powers, limitations, and remedies. Prerequisite: PS 201.

PS 483 Contemporary Problems of American Constitutional Law (g)
3 hours 3 ①
Contemporary issues and problems in the area of public law. Prerequisite: two of the following: PS 317,318,319.

PS 487 The Policy Process (g)
5 hours 5 ①
The decision-making process, models, and systems in selected major policy fields. Simultaneous enrollment in SSc 411 is recommended for class research projects. Prerequisite: Two of the following: PS 311,325,326.

PS 488 Topics in Public Policy (g)
1 to 4 hours 1 to 4 ①
Contemporary public policy issues; for advanced undergraduates and graduate students. Topics vary; course may be repeated. Prerequisite: 5 upper division hours in political science.

PSYCHOLOGY

The Department of Psychology offers a major program leading to a B.A. or B.S. degree in general psychology. Courses also meet the needs of students desiring a knowledge of psychology as a part of their general education or professional background and prepare students for graduate study in psychology and related fields.

Departmental requirements:

Lower Division: General Psychology (Psy 200 or 201,202) and Human Development (Psy 311), *or* Human Differences (Psy 312), *or* Human Adjustment (Psy 314) *or* Behavior Analysis (Psy 221).

Upper Division: Experimental Psychology (Psy 321,322,), History and Systems of Psychology (Psy 426), 18 upper division hours in psychology, and approved statistics courses (minimum of 6 hours).

Psy 200 or 201-202 are prerequisite to all courses except Psy 111. Senior or graduate standing is required for all 400 (g) courses. Statistics 311 is strongly recommended, where not required, for all upper division courses.

Lower Division Courses

Psy 111 Personal Development
3 hours 3 ①
Self-understanding and development: emphasis upon attitudes, values, motivations, and emotional problems related to current college experiences. Format involves class and small group discussions. Open only to freshmen.

Psy 199 Special Studies
Terms and hours to be arranged

Psy 200 General Psychology
5 hours 5 ①
The scientific study of individual behavior and experience. Required for most other psychology courses. With Psy 221,311,312,314, or 321 constitutes a sequence in psychology. Prerequisite: sophomore standing.

Psy 201,202 General Psychology
3 hours each term 3 ①
Individual behavior and experience. Must be taken in sequence. Duplicates content of Psy 200. Prerequisite: sophomore standing.

Psy 221 Behavior Analysis
3 hours 2 ① 1 ②
Experimental course analyzing animal and human behavior: principles of operant conditioning and behavior modification; practical applications to therapy, education, interpersonal interaction, and child rearing. Course organized for self-pacing and independent study.

Upper Division Courses

Courses numbered 400-499 and designated (g) may be taken toward a graduate minor.

Psy 311 Human Development
3 hours 3 ①

Psychological development of the child from infancy to adolescence; implications for parents and educators; the mechanisms of development, roles of biology and experience, theories. Topics include perception, thinking, memory, social interaction, learning, and obstructions to development. Emphasis is on a sympathetic understanding of children. Prerequisite: Psy 200 or equivalent.

Psy 312 Human Differences
3 hours 3 ①

Development of skills in recognizing and appraising differences among individuals and among groups through use of case studies, autobiographies, readings, psychological measurements, and discussions. Integration of subjective and objective approaches.

Psy 314 Human Adjustment
3 hours 3 ①

Impact of personal meanings and behavior strategies upon life adjustment; stress, frustration, anxiety, conflict, and defense; self-concept and personality dynamics. Optional opportunity to explore personal styles of adjustment through activity projects, discussion groups, and workbooks/inventories. Prerequisite: Psy 200 or equivalent.

Psy 321,322,323 Experimental Psychology
4 hours each term 3 ① 1 ③

Psy 321: Application of psychological research techniques to problems of sensory psychology, especially audition. Prerequisite: Psy 200 and a minimum grade of C in a statistics course. *Psy 322:* Application of experimental psychology techniques to areas of human performance and learning in individual laboratory experiments. Prerequisite: Psy 321. *Psy 323:* Closely supervised independent experimental research on animal and human behavior in a student-generated project. Recommended for those planning advanced work beyond the bachelor's degree. Prerequisite: Psy 221,321,322.

Psy 330 Human Factors in Engineering
3 hours 3 ①

Factors affecting human performance in man-machine systems; research methods in applied experimental psychology; capabilities and limitations of human operator. Prerequisite: Psy 200 or 202. Not offered 1974-75.

Psy 350 Neuroanatomy of Human Behavior
3 hours 3 ①

Human neuroanatomy in relation to constraints which underlying structure places upon behavior and to how defects or alterations in structure change behavior. Topics include human neuroanatomy and neurology and basic neurophysiology.

Psy 361 Group Dynamics
3 hours 2 ②

Factors influencing interpersonal and small group processes. Readings, laboratory experience, and examination of such experience to develop awareness or personal roles and of interactions in groups. Prerequisite: Psy 200 or equivalent; upper division standing.

Psy 401 Research (g)
Psy 402 Independent Study
Psy 403 Thesis
Psy 405 Reading and Conference (g)
Psy 406 Projects (g)
Psy 407 Seminar (g)
Psy 408 Workshop (g)
Terms and hours to be arranged

Psy 411 Philosophical Foundations of Psychology (g)
4 hours 4 ①

Philosophical traditions as contributors to modern psychology, emphasizing scientific aspects of psychological theories. Prerequisite: Psy 200 or Psy 202. Not offered 1974-75.

Psy 412 Psychological Aspects of Late Adolescence (g)
3 hours 3 ①

Open forum discussion of current and critical issues surrounding psychological development during the period of late adolescence, based on individually developed reading and research sources.

Psy 413 Advanced General Psychology (g) 3 hours 3 ①

Psychological theories and experimental literature. Areas covered may include scientific method, perception, learning and higher conceptual processes, and social psychology. Application of psychological principles to the solution of interdisciplinary problems. Prerequisite: 3 hours of upper division psychology or equivalent.

Psy 414 Learning and Motivation (g)
3 hours 3 ①

Theoretical and experimental literature. Topics may include verbal learning, learning and retention, transfer of learning, short-term and long-term memory processes, storage and retrieval of information in memory, and applications to practical situations. Prerequisite: Psy 321 or 413 or equivalent.

Psy 415 Perception (g)
3 hours 3 ①

Human sensation and perception. Research findings and theories of perception in relation to information processing, decision processes, motivation, learning, memory, and underlying neurophysiological and biochemical mechanisms. Prerequisite: Psy 321 or equivalent.

Psy 419 Language and Thought (g)
3 hours 3 ①

Thought and language processes; problem solving, computer simulation, verbal learning in relation to thinking, concept formation, psycholinguistics, language acquisition, and the cultural factors involved in language and thought. Problem-solving approach used. Prerequisite: Psy 321 or 413 or equivalent.

Psy 421 Psychological Assessment: Principles and Methods (g)
3 hours 3 ①

Applications of descriptive statistics and simple probability to tests and testing; measurement concepts and theories, score transformations, reliability, validity, applications to examples, test construction theory and practice. Prerequisite: senior standing.

Psy 423 Psychological Assessment: Group Testing (g)
3 hours 3 ①

Application of measurement principles to group tests and testing; administration and scoring of tests; recording, interpretation, and use of results; sources, evaluation, and limitations of tests. Laboratory experience with tests of achievement, intelligence, aptitude, interest, and personality. Prerequisite: Psy 421.

Psy 424 Psychological Assessment: Individual Testing (g)
3 hours 1 ① 2 ②

Administration, scoring, and psychometric interpretation of one major individual psychometric test (Stanford-Binet or Wechsler); familiarity with other individually-administered tests.

Psy 426 History and Systems of Psychology (g)
3 hours 3 ①

Rise and development of major psychological concepts and methods, origins of the schools of psychology, and emphasis upon contemporary theory and applications of philosophy of science to psychology. Prerequisite: Psy 321 or Psy 413.

Psy 431 Human Factors: Design Principles
3 hours 3 ①

Psychological factors and research methods used in equipment and man-machine system design. Input, output, and central processes of human activity as related to illumination, displays, communications, atmospheric conditions, space, health, stress, and safety. Prerequisite: Psy 321. Not offered 1974-75.

Psy 435 Personality Theories (g)
4 hours 4 ①

Various theories of personality and specific applications; reading of original works; Freud, Adler, Lewin, Allport, social-psychological, stimulus-response and other theories. Prerequisite: Psy 413 or 426.

Psy 442 Attitude and Opinion Methodology (g)
3 hours 3 ①

Seminar format divided into attitude theory and scaling procedures. *Theory:* influence processes, attitude functions, consistency theory and behavior theory of attitude development and maintenance. *Scaling procedures:* unidimensional techniques of Thurstone, Likert, and Guttman. Prerequisite: Psy 321.

Psy 445 International Behavior (g)
3 hours 3 ①

Effect of perception of own and other nations attitudes toward international affairs; ideological and national loyalties, personal motive states, decision-making processes, and threat management-conflict resolution strategies. Laboratory focus upon simulation of inter-nation interaction and involvement with students engaged in cross-national education. Prerequisite: Soc 473 and PS 205, or equivalent.

Psy 446 Industrial Psychology (g)
3 hours 3 ①

Human relations in business, industry, the military, government, and other institutions; personnel selection, placement, and training; human engineering. Prerequisite: Psy 221 or 311 or 314 or 321.

Psy 451 Physiological Psychology (g)
3 hours 3 ①

Physiological bases of behavior; neurophysiological correlates of perception, learning, motivation, and sensory processes. Prerequisite: Psy 221 or Psy 321 or Z 332.

Psy 452 Physiological Psychology Laboratory
(g) 2 hours 2 ③

Methods and techniques used in physiological psychology; electrophysical recording, use of drugs, and general operative techniques, including surgical techniques for implantation of chronic stimulation and recording electrodes. Prerequisite or corequisite: Psy 451.

Psy 462 Behavior Deviations (g)
3 hours 3 ①

Differentiation between normal and abnormal behavior. Models of abnormality including psychoanalytic, learning, and humanistic approaches. Description of syndromes with emphasis on underlying causes and maintenance of behaviors. Case material used to illustrate concepts. Prerequisite: Psy 311 or 314 or equivalent.

Psy 470 Animal Psychology (g)
3 hours 3 ①

Problems in animal behavior; relation of animal research to general psychological processes such as learning, perception, and motivation; application of experimental methods to species-specific behavior. Prerequisite: Psy 221 or 321.

Psy 471 Animal Psychology Laboratory
(g) 2 hours 2 ③

Methods and techniques in the experimental study of animal behavior, classical and instrumental conditioning techniques, imprinting, and use of electrical and electronic systems in study of behavior. Prerequisite or corequisite: Psy 470.

Psy 481 Pre-practicum in Psychological Services
(g) 3 hours 2 ① 1 ③

Orientation to issues, problems, and values related to the helping relationship. Students observe in setting outside class, analyze taped counseling interviews, role-play interviews, and conduct interviews with volunteers. Small task-group format. Consent of instructor required. Prerequisite: senior standing.

Psy 482
Practicum in Psychological Services (g)
3 hours 2 ① 1 ③
Section A: Counseling and intake experience with students who apply for service at the OSU Counseling Center. Interviews video-taped and analyzed with supervisor and other participants. Consent of instructor required. Prerequisite: Psy 423, 481. *Section B:* Counseling experience, with college student volunteers. Interviews taped and analyzed with supervisor and participants. Consent of instructor required. Prerequisite: Psy 481.

Psy 485 Counseling and Psychotherapy (g) 3 hours 3 ①
Principles, attitudes, and techniques in counseling and psychotherapy applicable in a wide variety of settings and agencies; current issues, research, and selected case studies. Prerequisite: Psy 462.

RELIGIOUS STUDIES

The Department of Religious Studies offers a major program leading to the B.A. degree. The department regards the study of religion as an essential part of liberal, humane learning and seeks to assist students in understanding the role religion plays in human existence. Special attention is directed to contemporary religious movements and to non-Western religious thought. The instruction is nonsectarian and seeks an open analysis of all points of view.

Courses are designed to provide a general orientation to the field of religion for the undergraduate student as well as more advanced courses for those who wish to pursue professional careers where a study of religion would be useful, such as psychology, sociology, history, teaching, law, medicine, the ministry, and religious education.

Lower Division Courses

R 101 Introduction to Religious Studies
4 hours 4 ①
Major religious perspectives concerning God, man, and the world; religious knowledge; evil; relation of religion to secular ideologies and value systems.

R 199 Special Studies
Terms and hours to be arranged

R 201
Introduction to the World's Religions
5 hours 5 ①
The origin, thought, and life style of man's major religions: Hinduism, Buddhism, Taoism, Confucianism, Judaism, Christianity, Islam.

R 204,205,206
Western Religious Thought
3 hours each term 3 ①
History of the main Jewish and Christan traditions from the Old Testament to contemporary religious expressions.

R 211 The Old Testament and Its Historical Background
5 hours 5 ①
Times and conditions which produced Old Testament, religion of Israel with critical survey of sources.

R 212 The New Testament and Its Historical Background
5 hours 5 ①
Time and conditions out of which New Testament writings came, problems that gave rise to Christian movement.

R 231
The American Religious Heritage
3 hours 3 ①
Development of main religious groups in America: Catholicism, Judaism, Protestantism; role of religion in American life.

R 241 Perspectives in Religious Ethics
3 hours 3 ①
Ethical teachings of some major religious traditions. Religious perspectives on contemporary issues of sex, race, politics, and others.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit

R 301,302,303 Religions of Mankind
4 hours 4 ①
Religions that command a large following today. *R 301:* Primitivism, Ancient Near Eastern Religions, Greek Religion, Hinduism. *R 302:* Buddhism, Confucianism, Taoism, Lamaism, Shintoism. *R 303:* Zoroastrianism, Judaism, Christianity, Mystery cults, Islam. Each term may be taken independently.

R 331,332,333
Contemporary Religious Thought
3 hours 3 ①
Examination of the major religious problems and thinkers of the twentieth century.

R 341 The Historical Traditions of the Old Testament
3 hours 3 ①
A historical-critical examination of the traditions involved in the historical books of the Old Testament. Prerequisite: R 211.

R 351 The Synoptic Literature
3 hours 3 ①
An historical-critical examination of the traditions about Jesus in Matthew, Mark, and Luke. Prerequisite: R 212.

R 402 Independent Study

R 405 Reading and Conference

R 407 Seminar (g)
Terms and hours to be arranged
Prerequisite: 3 hours of religious studies and upper division standing.

R 411 Religion and Society (g)
3 hours 3 ①
Relation of religion to society, social structures, and social processes. Prerequisite: R 101; Soc 205; upper division standing.

R 412 Religion and the Arts
3 hours 3 ①
Relation of religion to the forms and contents of various media of artistic creativity and expression.

R 413 Religion and Science (g)
3 hours 3 ①
History of relations between religion and science, methods of science and religion, implications of scientific theories for religious thought. Pererquisite: R 101,206; upper division standing.

R 415 Religions of Japan (g)
3 hours 3 ①
Role of Shintoism and Buddhism in Japanese life and culture. Prerequisite: R 301,302.

R 416 Religion, Ethics, and Ecology (g) 3 hours 3 ①
Religious and ecological concepts of man's relation to nature, human values and environmental problems, current quests for an environmental ethic and a theology of nature. Prerequisite: R 101 or upper division standing.

R 425
The Existential Self and Religion (g)
3 hours 3 ①
Existentialist views of the self in relation to the world, other selves, and religious experience. Prerequisite: 3 hours of religious studies or philosophy, or upper division standing.

R 427
Process Philosophy and Religion (g)
3 hours 3 ①
Basic themes; God, creativity, time, evolution, and freedom; major attention to the thought of Whitehead. Prerequisite: 3 hours of religious studies or philosophy or upper division standing.

R 463 Psychology of Religion (g)
3 hours 3 ①
Human nature and behavior as seen by psychology and by religion; selfhood, motivation, conscience, freedom, faith, doubt; psychotherapy and religion.
See Also Eng 275. The Bible as Literature; Phl 348. Philosophy of Religion; Soc 461. Sociology of Religion.

RUSSIAN STUDIES

The B.A. degree program in Russian studies is especially suited to students interested in a broad knowledge of significant non-American centers of world power and influence.

It provides an excellent foundation for advanced study or for special career activities in American business, cultural, technical, and political participation in international agencies.

Candidates for graduation must complete the following:
1. University requirements for the B.A. degree (see page 14), with Russian used to meet the language requirement.
2. College of Liberal Arts distribution requirements (see page 35).
3. A minimum of 45 hours of approved courses including (*a*) either Rus 127,128 *or* Hst 440,441; (*b*) a minimum of 33 hours from at least *three* of the five participating departments — Economics, Geography, History, Modern Languages, and Political Sciences—chosen from Ec 450,451,453; Geog 427; Hst 440,441,450; LS 407; PS 346,438; RS 127,128; Rus 311,312,313 / 314,315,316 / 317,318,319/ 411,412,413 / 421,422,423 / 461,462,463; *and* (c) a minimum of one 3-hour seminar (407) in either economics, geography, history, or political science in senior year.

Students interested in this major should consult the Committee on Russian Studies.

Lower Division Courses

RS 127,128
Introduction to Russian Culture
5 hours each term 2 ② 1 ①
RS 127: The Imperial heritage. *RS 128:* The Soviet era. Must be taken in sequence.

SOCIAL SCIENCES (GENERAL)

SSc 411
Social Science Research Laboratory
Terms and hours to be arranged
Empirical analysis and computer utilization in social science research. Prerequisite: 10 hours of social science coursework.

SSc 423 Small Group Behavior (g)
3 hours 3 ①
Field and laboratory research and developments in small group dynamics and processes. Prerequisite: Sp 323 or Psy 221.

SSc 424 Theory of Conflict and Conflict Management (g)
3 hours 3 ①
Intrapersonal, interpersonal, and intergroup conflict; causes and effects of conflict; social and psychological aspects of conflict behavior; decision making, force, suppression and destruction; conflict development and areas of greatest social conflict. Prerequisite: Sp 323 or Psy 221.

SOCIOLOGY

The Department of Sociology offers undergraduate programs leading to B.A. and B.S. degrees. Courses are offered to meet the needs of (1) students majoring in sociology, (2) students concentrating on sociology in the liberal studies degree program, and (3) students choosing such courses as a part of other degree programs or desiring a comprehensive understanding of human societies.

Departmental requirements:

General Sociology (Soc 204,205); Methods of Social Research (Soc 328) and Sociological Theory (Soc 354); additional sociology courses which may include 3 hours of statistics (minimum of 30 hours). **A minimum GPA of 2.00 must be earned for all major courses.**

Courses in Sociology

Lower Division Courses

Soc 204,205,206 General Sociology
3 hours each term 3 ①
Soc 204: The structure and functioning of human groups. *Soc 205:* Analysis of the major social institutions. *Soc 206:* Basic concepts applied to problems in group life. Soc 204 prerequisite to Soc 205, Soc 206.

Upper Division Courses

Upper class standing is required for all 400 courses. Courses numbered 400-499 and designated (g) may be taken toward a graduate minor.

Soc 312 Sociology of the Family
3 hours 3 ①
Historical development of the family as an institution, its structure and functions, changes in process. Prerequisite: Soc 204.

Soc 328 Methods of Social Research
5 hours 3 ① 1 ②
The nature of philosophy of science; quantitative data; hypotheses, measures, research designs; basic procedures and techniques of data collection and measurement. Prerequisite: Soc 205.

Soc 341 Population Trends and Policy
3 hours 3 ①
Numbers and quality of human populations; basic factors affecting growth rates and composition; trends, policies, and problems. Prerequisite: Soc 204.

Soc 354 Sociological Theory
3 hours 3 ①
Theory relating to group life; social and philosophical bases for sociological theory. Prerequisite: Soc 205.

Soc 361 Social Organization
3 hours 3 ①
Structural aspects of social groups with emphasis on institutions, formal organizations, and bureaucracies. Prerequisite: Soc 205.

Soc 401 Research
Soc 402 Independent Study
***Soc 405 Reading and Conference (g)**
***Soc 406 Projects (g)**
Terms and hours to be arranged

* Graduate credit for Soc 405 and Soc 406 must not total more than 9 hours.

Soc 407 Seminar (g)
Terms and hours to be arranged
Prerequisite: Soc 205; junior standing.

Soc 409 Practicum
Terms and hours to be arranged

Soc 411 Juvenile Delinquency (g)
3 hours 3 ①
Contemporary sociological research, programs to reduce delinquency and treat delinquents. Prerequisite: Soc 205; junior standing.

Soc 412 Criminology and Penology (g)
3 hours 3 ①
Contemporary sociological research, and criminology and penology; programs to reduce crime and treat criminals. Prerequisite: Soc 205; junior standing.

Soc 421 Social Change (g)
3 hours 3 ①
The nature, types, causes, and consequences; major theories. Prerequisite: Soc 205; junior standing.

Soc 427 Social Movements (g)
3 hours 3 ①
Processes whereby social movements are formed, to attempt to bring about social consequences of various procedures used to change society, consequences of the organizational structure and ideologies of social movements. Prerequisite: Soc 205; junior standing.

Soc 429
Techniques of Social Research (g)
3 hours 3 ①
Student research projects to apply and evaluate the techniques and procedures of common means of data collection. Brief review of basic methodology. Prerequisite: Soc 328 or consent of instructor.

Soc 430 Theory of Small Groups (g)
3 hours 3 ①
Current theoretical works dealing with small group behavior from the standpoints of interactional processes, structure, and function. Prerequisite: Soc 205; junior standing.

Soc 434 Social Stratification (g)
3 hours 3 ①
Bases, social mobility, significance of stratification in American society. Prerequisite: Soc 205; junior standing.

Soc 436 Collective Behavior (g)
3 hours 3 ①
Study of spontaneous group and individual behaviors resulting from previously unexperienced conditions calling for immediate action; mobs, riots, panics, crazes. Prerequisite: Soc 205; junior standing.

Soc 437 Sociology of Minority Relations (g) 3 hours 3 ①
Relations between racial, ethnic, and religious groups analyzed in sociological terms; factors causing changes in the relationships. Prerequisite: Soc 205; junior standing.

Soc 456 Industrial Sociology (g)
3 hours 3 ①
Sociology of work relations; industrial worker and his community, industry and society. Prerequisite: Soc 205; junior standing.

Soc 459 Medical Sociology (g)
3 hours 3 ①
Social and cultural factors in the identification, course, and treatment of illness; analysis of selected health professions. Prerequisite: Soc 205; junior standing.

Soc 461 Sociology of Religion (g)
3 hours 3 ①
Social patterns within U. S. religious groups, relation of religious groups to society, methodological problems in studying such groups.

Soc 465 Political Sociology (g)
3 hours 3 ①
Political theories of change, theories of voting behavior, socio-political movements, revolutions, and modernization; analysis of the concepts of power and authority; decision makers and the decision-making process. Prerequisite: Soc 205; junior standing.

Soc 468 Sociology of Urban Life (g)
3 hours 3 ①
The modern city; its history, structures, functions, and problems. Prerequisite: Soc 205; junior standing.

Soc 469 Sociology of Rural Life (g)
3 hours 3 ①
Rural institutions and communities in a changing society. Prerequisite: Soc 205; junior standing.

Soc 471
Contemporary Sociological Theory (g)
3 hours 3 ①
A study of contemporary sociological theory relating to the principal areas of specialization in the field. Prerequisite: Soc 354; junior standing.

Soc 473,474 Social Psychology (g)
3 hours each term 3 ①
Soc 473: Human behavior, individual and social adjustments in terms of prevailing social systems. *Soc 474:* Supporting research contributions. Prerequisite for 473: Soc 205; junior standing. For 474: Soc 328,473; junior standing.

Soc 475 Community Organization (g)
3 hours 3 ①
The community: its social structure, functioning, and development. Prerequisite: Soc 205; junior standing.

Soc 490 Educational Sociology (g)
3 hours 3 ①
The operation of educational organizations, with comparative analysis of such organizations. Prerequisite: Soc 205; junior standing.

SPEECH COMMUNICATION

The Department of Speech Communication offers major programs leading to a B.A. or B.S. degree providing both theoretical and practical aspects of human oral communication as a liberal art, as a social science, as background for further study, or as preprofessional experience.

Departmental requirements:

A student majoring in speech communication completes the speech communication core courses (Sp 111, 201, 202,370,420), and 27 term hours in *one* of the following areas:

Broadcast Media Communication
Individual Communication Studies
Public, Group, and Interpersonal Communication
Speech Communication Science and Disorders
Theater Arts

Students preparing to teach in public schools must meet the requirements for certification (see SCHOOL OF EDUCATION); participate satisfactorily in at least two terms of cocurricular activities in theater, forensics, or broadcast media; and complete 21 term hours in broadcast media communication, general oral communication, public, group, and interpersonal communication, or theater arts.

Requirements for state certification in speech correction include completing a minimum of 43 term hours beyond the speech communication core, and having at least 230 clock hours of actual clinical practice.

Cocurricular speech activities open to *all students*, regardless of major or academic training, include the university theater, KBVR TV-FM, forensic activities (debate and individual events), Model United Nations, and speech and hearing clinic.

Research programs, both graduate and undergraduate, are open to selected students interested in studies of small-group behavior, language perception, the broadcast media, theater, and other areas.

Lower Division Courses

Sp 90 Corrective Speech
1 hour any term, three terms 2 ①
For students having organic and/or functional speech disorders; group meetings of class, supplemented by clinical periods devoted to individual evaluation and treatment.

Sp 91 Speech for Foreign Students
2 hours 2 ①
To help foreign students acquire accepted standards of general American speech. Training in aural discrimination of component parts of speech and American speech rhythm, pronunciation, and enunciation.

Sp 111
Interpersonal Speech Communication
3 hours 3 ①
Basic concepts: role of speaker, message construction, listening behavior, feedback, conversation, discussions, informal communication interaction.

Sp 112 Informative Speaking
3 hours 3 ①
Creative speaker-audience communication with emphasis on expository public speaking.

Sp 113 Introduction to Persuasion
3 hours 3 ①
Processes of persuasive speaking, rhetoric and psychology of oral communication, theory and laboratory experience. Prerequisite: Sp 111 or Sp 112.

Sp 120 Voice and Articulation
3 hours 3 ①
Expressiveness, intelligibility, pronunciation, projection, quality; principles and techniques of improvement; physics and physiology of voice production; and introduction to phonetics.

Sp 121,122 Interpretation
3 hours each term 3 ①
Analysis and presentation of printed materials, emotional reactions that give color and interest, expressive vocal and bodily responses, pantomime, characterization, interpretative techniques. Must be taken in sequence.

Sp 147 Introduction to the Theater
3 hours 3 ①
Origins, history, nature, elements, and style of drama; function of artists and craftsmen in the theater. Prerequisite to all theater arts courses except as specifically noted.

Sp 160 Introduction to the Motion Picture
3 hours 2 ① 1 ②
The motion picture from prephotographic eras to the present, individuals responsible for major advances in theory and technique. Films viewed for discussion and analysis.

Sp 199 Special Studies
Terms and hours to be arranged

Sp 201,202
Survey of Speech Communication
4 hours each term 4 ①
Sp 201: Utilitarian and therapeutic speech communication; human communication systems; roles, strategies, rituals, and codes that supplement speech communication behavior. *Sp 202:* Aesthetic speech communication; speech communicator as an artist; universal and personal standards for judging outcomes of aesthetic speech communication. Need not be taken in sequence.

Sp 231 Conduct of Meetings
3 hours 3 ①
Planning and leading open forums; committee, business, and other public or organizational meetings. Parliamentary procedure.

Sp 240
Creative Drama for Elementary Teachers
3 hours 3 ①
Creative dramatics in elementary classroom; principles and methods of developing original dramatization with children; methods in acting, staging, and costuming for assembly programs; correlation with classroom studies. Consent of instructor required.

Sp 241 Introduction to the Broadcast Mass Media
3 hours 3 ①
Nature and structure of American system of broadcasting: the government, the networks and stations, advertisers and agencies, and the public. Program types and methods of programming; social and cultural impact of the electronic mass media.

Sp 242 Recreational Use of Drama
3 hours 3 ①
Leadership and participation in recreational-creative dramatics; story-telling; creating original story; pantomime; improvisation in acting, staging, and costuming; correlation of music, art crafts, and drama for camp and playground. Prerequisite: recreation major or minor.

Sp 244 Scenecrafts
3 hours 2 ① 2 ③
Constructing scenery and stage properties, practical experience in backstage procedures and scene painting.

Sp 245 Stage Lighting
3 hours 3 ①
Fundamentals of electricity as used in stage lighting, color and light, light instruments and control systems, theory and practice of lighting stage productions. Prerequisite: Sp 244.

Sp 247 Stage Make-up
3 hours 3 ①
Basic principles and theory with laboratory experience in all phases of theatrical make-up.

Sp 248 Fundamentals of Acting
3 hours 3 ①
Acting theories and techniques, play and role analysis, with emphasis on modern realistic and representational styles.

***Sp 250**
Speech and Theater Workshop
1-3 hours each term, maximum 6 hours
Acting, dramatic production, public speaking, and broadcasting; laboratory experience; separate sections for public address and forensics, radio-television, and theater. Consent of instructor required.

* A maximum of 12 hours may be earned in courses designated by an asterisk with no more than 6 hours in either broadcasting, forensics, or theater.

Sp 262
Radio, Television, Film Speaking
3 hours 2 ① 1 ②
Theory and technique of personal communication through the media of radio, television, and film. Adapting principles and practices of oral communication to the electronic mass media. Audio and video tape recording and playback of laboratory projects under closed circuit conditions. Prerequisite: Sp 111.

Sp 267 Basic Television
3 hours 2 ① 1 ②
Equipment and lighting, including the camera, the TV switcher, video tape recording equipment, microphones, lighting instruments. Intensive practice in studio and control room operations. Laboratory experience includes serving as operational personnel for television productions.

Sp 275 Principles of Forensics
3 hours 3 ①
Theory and rationale of debate; expository, extempore, and speaking to entertain; oratory and other forms of forensic discourse.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Sp 311 Advanced Interpretation
3 hours 3 ①
Interpretative theory and programming, materials for oral interpretation, experimentation in presentational forms. Prerequisite: Sp 122.

Sp 321
Reasoning and Evidence in Controversy
3 hours 3 ①
Concepts and processes of argumentation, cogency in oral communication, systems of logic, critical analysis of contemporary efforts to convince, construction and presentation of cases. Prerequisite: Sp 111 and sophomore standing.

Sp 322 Persuasion
3 hours 3 ①
Attention, suggestion, motivation, and reason in persuasive discourse; problems and ethics of altering behavior, changing belief and inducing social control through the spoken word; consideration of ideas, delivery, and language style in analyzing and practicing persuasive speaking. Prerequisite: Sp 113 and sophomore standing.

Sp 323 Group Discussion Processes
5 hours 3 ① 2 ②
Dynamics of discussion, group thinking, and decision making, interpersonal relations, types of leadership, study of discussion through laboratory practice and analysis. Prerequisite: Sp 111. Consent of instructor required.

Sp 330,331,332 History of Theater Arts
3 hours each term 3 ①
The rise and development of the composite arts of the theater in their cultural and social context. *Sp 330:* Origins to 1500. *Sp 331:* 1500 to 1870. *Sp 332:* 1870 to present. Prerequisite: Sp 147.

Sp 346 Scene and Stage Design
3 hours 2 ① 2 ③
Physical theater, auditoriums and stages, scene designs, stage settings and design techniques. Prerequisite: Sp 147, Sp 244.

Sp 348 Advanced Acting
3 hours 3 ①
The demands made upon the actor by the nonrealistic modes of drama. Character in relation to style from the poetic, both classical and modern, to the anti-theater of the absurdists. The voice and body of the role. Prerequisite: Sp 248.

***Sp 350**
Speech and Theater Workshop
1-3 hours each term, maximum 6 hours
Advanced work in acting, dramatic production, public speaking, and broadcasting; laboratory experience; separate sections for public address and forensics, radio-television, and theater. Prerequisite: 3 term hours of Sp 250.

Sp 354 Fundamentals of Play Direction
3 hours 3 ①
History, theories, and techniques of directing; play selection and analysis, study of the audience. Practical experience is provided both in class and Laboratory Theater. Prerequisite: Sp 147, Sp 248.

Sp 361
Professional Radio Announcing
3 hours 2 ① 1 ②
Theory and practice. The announcer and station operations and structure. Laboratory practice in the activities of the announcer: reading of copy, the musical program, the talk program, the interview, newscasting. Prerequisite: Sp 111, 262.

Sp 362 Radio Production
3 hours 2 ① 1 ②
Use of microphones, sound and music, voice, and tape editing for creating sound messages. Radio performance as part of the production process. Prerequisite: Sp 241.

Sp 363 Radio and Television Writing
3 hours 3 ①
Writing for the electronic mass media. Special emphasis on writing continuity, copy, and narration; also the writing of radio feature programs and narrative and descriptive television programs. Prerequisite: Sp 262.

Sp 366
Creative Projects in Radio-Television
3 hours To be arranged
Projects in programming, production, or writing for radio or television, or for related fields of the electronic mass media. Student will work independently under direction of a faculty adviser. Prerequisite: Sp 241 and Sp 362 or Sp 363, or 367, or consent of instructor required.

Sp 367 Television Program Production
4 hours 3 ① 1 ②
The nature of visual communication through television, principles and techniques of developing and producing television program.

Sp 368 Broadcast Media Programming
4 hours 3 ① 1 ②
The philosophies, principles, and practices of broadcast media programming. Methods of audience analysis and measurement. Prerequisite: Sp 241.

Sp 370 Phonetics
3 hours 3 ①
The science of speech sounds as elements of language and the application of this science to oral communication.

Sp 371 Speech Science
3 hours 3 ①
Anatomy, psychology, and physics of speech; examination of key research on the scientific bases of speech.

***Sp 375 General Forensic Speaking**
1 hour each term, six terms
Advanced work in general forensic speaking. Prerequisite: Sp 275.

Sp 401 Research
Sp 402 Independent Study
Sp 403 Thesis
Terms and hours to be arranged.

* A maximum of 12 hours may be earned in courses designated by an asterisk with no more than 6 hours in either broadcasting, forensics, or theater.

[1]Sp 405 Reading and Conference (g)
Sp 406 Projects
[1]Sp 407 Seminar (g)
[1]Sp 408 Workshop (g)
Terms and hours to be arranged

Sp 414
Speech Communication in the Schools
(g) 3 hours 3 ①
History, philosophy, literature, and current practices in curricular and extracurricular speech programs of schools. Prerequisite: 9 hours of upper division speech communication courses.

Sp 420 Meaning and Communication
(g) 3 hours 3 ①
Theory of speech as communication; barriers and pathologies of oral communication; character of meaning, logic, symbols, and values in oral communication; models of communication and their application to speech behavior. Prerequisite: Sp 111,201,202.

Sp 423 Communication and Leadership in Small Group Discussion Processes (g)
3 hours 3 ①
Theories of leadership and communication and their particular application to the formal and informal small group discussion process. Prerequisite: Sp 323; Psy 361.

J 431 Broadcast Journalism
See JOURNALISM.

Sp 432
Public Speech-Communication Criticism
3 hours 3 ①
History and philosophy of rhetorical principles. Prerequisite: Sp 113.

Sp 439 American Public Address in the Twentieth Century (g)
3 hours 3 ①
Speech criticism; great American speakers; relation of their speaking to the history of ideas, and to political, social, and religious movements. Prerequisite: Sp 432.

Sp 444
Theory and Criticism of Theater Arts (g)
3 hours 3 ①
Major theories which have influenced and motivated theater practice in Western civilization throughout its development. Prerequisite: 6 hours of theater history or 6 hours of dramatic literature. Offered alternate years.

Sp 451 Instructional Uses of Television
(g) 3 hours 3 ①
Adaptation of audio-visual principles of communication to presentation of informational materials by television; uses of sound, film, music, graphics, and related aids. Prerequisite: Sp 367.

Sp 454 Advanced Play Directing
3 hours 3 ①
Role of the director as "artist-in-chief" of dramatic productions with emphasis on selecting and adapting historical as well as avant-garde plays for modern production. Prerequisite: Sp 354.

Sp 464,465 History of Theater Architecture and Design (g)
3 hours each term 3 ①
History and development of the architecture, scenic design, and visual aspects of the theater. *Sp 464:* Origins to 1650. *Sp 465:* 1650 to the present. Prerequisite: Sp 147.

Sp 467 Television Directing (g)
3 hours 2 ① 1 ②
Theory and practice of television directing; translation of concepts, ideas, emotions, and attitudes into visual and aural imagery; nature and structure of visual and aural imagery. Prerequisite: Sp 367.

[1] Graduate credit under Sp 405,407,408 must not total more than 9 hours.

Sp 470
Speech and Language Development (g)
3 hours winter 3 ①
Norms, schedules, and theories of speech and language development in early childhood; observation and analysis of programs used at various educational centers. Prerequisite: 6 hours of child psychology and/or development. Offered winter term of even-numbered years.

Sp 472 Experimental Phonetics (g)
3 hours 2 ① 1 ②
Techniques and methods in analysis, synthesis, perception, and measurement of voice and speech. Laboratory period required. Prerequisite: Sp 371.

Sp 481,482,483 Speech Pathology (g)
3 hours each term 3 ①
Symptoms, causes, and treatment of speech disorders. For students intending to qualify as speech clinicians. *Sp 481:* Functional articulatory defects, delayed speech, emotional disorders. *Sp 482:* Organic disorders; deviations due to congenital malformation, injury, deafness, and neurological impairment. *Sp 483:* More serious or prolonged disorders, including stuttering. Prerequisite: Sp 370,371.

Sp 484,485,486
Clinical Methods in Speech Correction
(g) 3 hours each term 3 ①
Practical experience in handling cases, including taking of case history, making diagnosis, and giving remedial treatment. Prerequisite: Sp 481, 482.

Sp 487,488,489 Audiology (g)
3 hours each term 3 ①
Auditory function, hearing impairment, and education, or re-education of persons with hearing loss. *Fall:* Fundamentals of acoustics, anatomy and physiology of the ear, types and causes of hearing loss, speech involvements. *Winter:* Techniques and interpretation of auditory tests such as pure tone and speech audiometry. *Spring:* Psychology of the acoustically impaired, speech and auditory training, school and vocational problems. Prerequisite: Sp 370,371.

Sp 490 Lip Reading (g)
3 hours 3 ①
Theories and methods of speech reading and auditory training, their part in education and rehabilitation of deaf and hard-of-hearing children and adults; lip reading methods.

Sp 491 Communication with the Hearing Impaired (g)
3 hours winter 3 ①
TECHNIQUES FOR facilitating individual communication; intensive training in use of the manual alphabet, language of signs, and cued speech. Prerequisite: 9 hours of audiology.

Sp 492 Aural Rehabilitation (g)
3 hours spring 3 ①
Organization of programs in schools, hospitals, geriatric centers, and speech and hearing centers; training programs utilizing individual and group hearing aids. Prerequisite: Sp 487,488, 489,490.

Sp 493 Principles and Techniques of Speech Correction (G)
3 hours 3 ①
Nature, causes, diagnosis, and treatment of speech defects of children and adolescents. Primarily for classroom teachers.

Sp 494 Practicum in Speech Pathology or Audiology (g)
1-9 hours To be arranged
Advanced and experienced students organize, conduct, and evaluate identification, re-education, and follow-up programs. Clinical areas covered depend upon background and experience of students, and nature of program and case load available. Maximum credit allowed only when covering new areas. Prerequisite: 15 hours of speech pathology or audiology. Consent of instructor required.

SCIENCE

FACULTY

As of January 1974

ROBERT W. KRAUSS, Ph.D., Dean, College of Science

FRANCOIS A. GILFILLAN, Ph.D., Dean Emeritus

THERAN D. PARSONS, Ph.D., Associate Dean

OLAF A. BOEDTKER, Ph.D., Student Personnel Adviser

PROFESSORS EMERITUS Hansen, Milbrath, McWhorter, Smith in *Botany;* Christensen, Gilfillan, Kurth, Logan, Mehlig in *Chemistry;* Jones, Martin, Scullen, Thompson in *Entomology;* Beer in *General Science;* Allison, Packard in *Geology;* Bollen in *Microbiology;* Brady, Yunker in *Physics;* Gordon, Krueger, Wulzen in *Zoology.* EMERITUS ASSOCIATE PROFESSORS: Garman, Tatom, Vinyard in *Physics.* EMERITUS ASSISTANT PROFESSORS: Bakkum, Flood, Herrmann in *Mathematics;* Church in *Physics.* EMERITUS INSTRUCTOR: Atwood in *Botany.*

Atmospheric Sciences: PROFESSOR Hewson (department chairman)

ASSOCIATE PROFESSOR Decker

ASSISTANT PROFESSORS Mahrt, Peterson

Biochemistry and Biophysics: PROFESSORS Newburgh (department chairman), Becker, Bishop, Evans, Fang, Freed, Isenberg, Loomis, MacDonald, Parks, Reed, Terriere, Tinsley, Van Holde, Weswig

ASSOCIATE PROFESSORS Anderson, Baisted, Buhler, Beaudreau, Dyson, Gamble, Johnson, Morris, Whanger, Wickman

ASSISTANT PROFESSORS Cardenas, Pearson, Schaup

Botany: PROFESSORS T. Moore (department chairman), Allen, Bartsch, Bishop, Cameron, Chambers, Chilcote, Converse, Corden, Evans, Hardison, Horner, Jensen, Krauss, Leach, MacSwan, Phinney, Roth, Shay, Young, Zak

ASSOCIATE PROFESSORS Brandt, Coyier, Culver, Denison, Hampton, Linderman, McIntire, Powelson, Quatrano, Rickson, Trappe, Trione

ASSISTANT PROFESSORS Dennis, Dooley, Knutson, Koepsell, L. Moore, Nelson, Zobel

INSTRUCTORS Dilworth, Johnston, Obermire

Chemistry: PROFESSORS Shoemaker (department chairman), Daniels, Decius, Fredericks, Freeman, Freund, Hedberg, MacVicar, Marvell, Norris, Parsons, Reese, Schmitt, Scott, Slabaugh, Thomas, Wang, Williams, Yoke

ASSOCIATE PROFESSORS DeKock, Gleicher, Hawkes, Krueger, Nibler, Piepmeier, White, Wickman

ASSISTANT PROFESSORS Ingle, Loveland, Thies, Wilson

INSTRUCTOR Hopkins

Computer Science: PROFESSORS Short (department chairman), Gagliardo, Goheen, Hunter

ASSOCIATE PROFESSORS Davis, Yates

ASSISTANT PROFESSORS Cook, Cull

INSTRUCTORS Bachelor, Brenne, Frank

Entomology: PROFESSORS Oman (acting department chairman), Brookes, Goulding, Krantz, Lattin, Ritcher, Rudinsky, Stephen, Swenson, Terriere

ASSOCIATE PROFESSORS Anderson, Nagel

ASSISTANT PROFESSORS AliNiazee, Berry

General Science: PROFESSORS Willis (department chairman), Fox, Kimeldorf, Trout

ASSOCIATE PROFESSORS Craven, Evans, Kelley, Lyford, Morris, Spencer, Van Dyke

ASSISTANT PROFESSORS Farber, Forslund, Johnson, Jones, McDonald, Mix

INSTRUCTORS Cowley, King, Wiinikka

Geography: PROFESSORS Highsmith (department chairman), Heintzelman, Jensen, Lahey, Northam

ASSOCIATE PROFESSORS Frenkel, Maresh, Muckleston, Pease

ASSISTANT PROFESSORS Bard, Nolan

Geology: PROFESSORS ENLOWS (department chairman), Boucot, Oles, Taubeneck

ASSOCIATE PROFESSORS Bostwick, Field, Johnson, Taylor

ASSISTANT PROFESSORS Dasch, Lawrence, Niem

Mathematics: PROFESSORS Andreotti, Anselone, Arnold, Ballantine, Bodvarsson, Carlson, Carter, Firey, Gagliardo, Goheen, Kaplan, Lonseth, Narasimhan, Oberhettinger, Poole, Simons, J. W. Smith, K. T. Smith, Stalley, Stone

ASSOCIATE PROFESSORS Brown (department chairman), Davis, B. I. Fein, Flaherty, Guenther, Kas, Newberger, Petersen, Saunders, Soule, Wilson

ASSISTANT PROFESSORS Cull, B. Y. Fein, Glassmire, Godard, Kottman, Lee, Lindstrom, Musser, Overholser, D. M. Smith

INSTRUCTORS Curl, Rachele

Microbiology: PROFESSORS Elliker (department chairman), Anderson, Fryer, Morita, Parks, Pilcher, Sandine

ASSISTANT PROFESSORS Brown, Seidler

INSTRUCTORS Curran, Roth

Physics: PROFESSORS Schecter (department chairman), Burch, Cutler, Easterday, Madsen

ASSOCIATE PROFESSORS Boedtker, Drake, Fairchild, Fessenden, Fontana, Gardner, Griffiths, Richert, Swenson, Wasserman

ASSISTANT PROFESSOR Kocher

Statistics: PROFESSORS Calvin (department chairman), Brunk, Everson, Overton, Petersen, Hunter

ASSOCIATE PROFESSORS Faulkenberry, Pierce, Rowe, Ramsey, Seely, Thomas

ASSISTANT PROFESSORS Hartmann, Lembersky

INSTRUCTOR Scheurman

Zoology: PROFESSORS Dornfeld (department chairman), Alvarado, Conte, Hillemann, Pritchard, Roberts, Storm

ASSOCIATE PROFESSORS Dawson, Hisaw, Owczarzak, Wiens

ASSISTANT PROFESSORS Bayne, Gonor, Morris

INSTRUCTORS Mullen, Sype

THE COLLEGE OF SCIENCE at Oregon State University offers (1) liberal arts courses with majors in various fields of science leading to the Bachelor of Arts or Bachelor of Science degree; (2) professional education, which may include an undergraduate science major and from one to three or more years of graduate study, for students planning to enter an occupational field in science; and (3) elective and service courses for students in other schools.

Honors Program

The Honors Program provides opportunity for individual enrichment and achievement. For information regarding eligibility, application forms, organization of the program, and appointment of advisers see UNIVERSITY HONORS PROGRAM elsewhere in this catalog.

Grouping of Departments

The departments of the College of Science have been informally divided into three sections:

Physical and Mathematical Sciences

The Departments of Chemistry, Computer Science, Mathematics, Physics, Biochemistry and Biophysics, and Statistics aim (1) to provide a liberal training for students whose interests and capabilities enable them to pursue studies in these areas, (2) to stimulate the creativity through research of graduate students and more capable undergraduate students, and (3) to provide instruction for students from other departments whose training requires some knowledge of the physical environment and use of the methods of mathematics and statistics.

Biological Sciences

Opportunities for the study of biological or life sciences at both the undergraduate and graduate levels are extensive. Students elect major programs in the Departments of Biochemistry and Biophysics, Botany, Entomology, Microbiology, or Zoology, or combination programs through the Departments of General Science and Science Education. The several curricula provide for supporting work in mathematics and the physical sciences. Courses in biological oceanography, radiation biology, biochemistry, biophysics, and statistics may be included as electives in biological curricula. A special program is offered jointly by the College of Science and the School of Agriculture for a graduate major or minor in genetics. (See GRADUATE SCHOOL.)

Earth Sciences

All branches of science are related in some way to the earth, but those specific departments which deal with the earth directly are grouped under the EARTH SCIENCES: atmospheric sciences, geography, geology and paleontology. Students interested in undergraduate and advanced training in these areas may choose from comprehensive course offerings.

Special Programs

SPECIAL PROGRAMS in the College of Science provide: (1) opportunities of study in either broad or specialized curricula which involve two or more of the traditional departmental subject areas, (2) curricula for preprofessional programs which in most cases are supervised by committees representing the principal departments concerned, and (3) training for science teachers. Special programs include general science; science education; preprofessional programs in dentistry, dental hygiene, medicine, medical technology, nursing, physical therapy, veterinary medicine.

Curricula in Science

Curricula are offered leading to the degree of Bachelor of Arts (B.A.), Bachelor of Science (B.S.), Master of Arts (M.A.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.). (See GRADUATE SCHOOL for statement of requirements for advanced degrees.)

General notes concerning school and institutional requirements for B.A. and B.S. degrees follow:

a. In recognition of the need for a balanced general education for those planning professional careers in science, none of the curricula in the College of Science requires more than 60% of the course hours to be in areas of science and in no instance is more than 40% of the work required in a single area; thus, in addition to receiving a firm foundation in the basic sciences, the student has liberal opportunity to elect courses in other fields.

b. All undergraduates must, unless exempt, complete the following work prior to the senior year; three terms of physical education, and one term of personal health.

c. To graduate, each undergraduate student must complete one year of no less than 9 term hours in approved communication skills which must include Wr 121 or its equivalent. To apply on requirement, all additional courses must be approved by the major department and the Dean of the College of Science.

d. Each College of Science curriculum requires the student to meet the following minima: (1) one year of approved biological science; (2) one year of approved physical science; (3) 18 term hours of approved humanities and/or social sciences. To apply on requirement, all courses must be approved by both the major department and the Dean of the College of Science.

e. For graduation, each student in the College of Science is required to maintain a minimum 2.00 GPA in his major field as well as to meet OSU institutional requirements. Some science curricula have requirements in excess of this minimum.

f. Unless otherwise indicated, terms and hours for Research, Thesis, Reading and Conference, and Seminar are to be arranged.

Courses and Curricula in Science

ATMOSPHERIC SCIENCES

The atmospheric sciences encompass the physics and chemistry of the atmosphere, biometeorology, engineering meteorology, and aeronomy—the science of the high atmosphere.

In addition to providing a broadly based liberal arts education with emphasis on the physical sciences, the undergraduate major in atmospheric sciences helps students prepare for professional careers as weather forecasters in the National Weather Service, in the armed services, in television broadcasting, or in private meteorological firms. Graduate study provides the basis for responsible positions in government, industry, and teaching.

Undergraduates major in meteorology and weather forecasting with emphasis, if desired, in one of the fields of the graduate majors.

Graduate majors are air pollution meteorology, dynamic meteorology, and micrometeorology.

Curriculum

Freshman Year

	Hours
Mathematics (Mth 110,111,112)	12
General Chemistry (Ch 201,202,203 or Ch 204,205,206)	9–15
Foreign language	12
English Composition (Wr 121)	3
Physical education	3
Personal Health (H 160)	3
Electives	1–7

Sophomore Year

Mathematics (Mth 113,211,321)	12
Physics (Ph 211,212,213) (counts toward 36 hours required for major)	12
Biological science requirement	9–15
Approved courses in communication skills	3
Electives	6–12

Junior Year

Basic Meteorology (AtS 304,305,306)	15
Computer programming	3
Upper division sequence in physics	9
Approved courses in humanities or social sciences	9
Approved courses in communication skills	3
° Electives	9

Senior Year

Weather Analysis Lab (AtS 433,434,435)	9
Atmospheric science electives (400-level AtS courses)	6–12
Approved sequence in humanities or social sciences	9
° Electives	24–18

° Students intending to do graduate work in the atmospheric sciences are expected to take upper division sequences in mathematics and/or physics.

Lower Division Courses

AtS 101 Rudiments of Meteorology
1 hour any term 1 ①
A descriptive treatment of meteorological phenomena, including winds, air masses, fronts, clouds, the wave cyclone, precipitation.

AtS 199 Special Studies
Terms and hours to be arranged

AtS 292
Weather and Human Interactions
3 hours winter 3 ①
Man's adaptation to weather processes and his attempts to modify weather; growth of meteorological services; typical weather situation case studies involving agriculture, industry, and military action. Prerequisite: AtS 101.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

AtS 300
Introduction to the Atmosphere
3 hours any term 3 ①
Fundamental processes and structure of the atmosphere. Properties of the atmosphere explained in terms of the laws of motion, thermodynamics, and radiation. Ecological implications of air pollution and the impact of population, growth, and industrialization on air environment.

AtS 301 Weather Analysis Laboratory
2 hours 1 ②
Weather map plotting and analysis. Corequisite: AtS 300.

AtS 304,305,306 Basic Meteorology
5 hours each term 1 ① 2 ②
Elementary statics, thermodynamics, and dynamics of the atmosphere; phase changes of water; the general circulation; weather and motion systems, including severe storms; mesoscale systems; introduction to weather analysis and forecasting systems. Prerequisite: One year of physics; Mth 321.

AtS 401 Research

AtS 403 Thesis

AtS 405 Reading and Conference

AtS 406 Projects

AtS 407 Seminar
Terms and hours to be arranged

AtS 412 Physical Climatology (G)
3 hours fall 3 ①
Physical processes leading to climatic types, theories of climatic change, classification of climates. Prerequisite: AtS 306.

AtS 413 Climatology Laboratory (G)
2 hours winter 2 ③
Analysis, interpretation, and application of standard and special climatological data. Prerequisite: AtS 412; St 311.

AtS 421 Atmospheric Thermodynamics (G) 3 hours fall 3 ①
Ideal gas law; thermodynamics of dry and moist processes, moist convection, thermodynamics and energetics of simple circulations. Prerequisite: AtS 306.

AtS 422
Atmospheric Radiative Processes (G)
3 hours winter 3 ①
Nature of radiation, solar and terrestrial radiation, satellite measurements of solar and terrestrial radiation. Prerequisite or concurrent: AtS 306.

AtS 425,426 Atmospheric Dynamics
(G) 3 hours winter, spring 3 ①
Basic conservation of momentum equations on a rotating sphere; mass continuity, circulation, and vorticity theorems; planetary boundary layers; basic wave theory; wave theory of rotating fluids; barotropic and baroclinic instabilities. Prerequisite: AtS 306.

AtS 433 Weather Analysis Laboratory
(g) 3 hours fall 3 ②
Weather map plotting and analysis, three-dimensional structure of fronts and atmospheric waves. Prerequisite or concurrent: AtS 300 or AtS 304.

AtS 434 Weather Analysis Laboratory
(g) 3 hours winter 3 ②
Determination of the fields of atmospheric vorticity, divergence, vertical velocity, and advection by graphical and numerical techniques. Prerequisite or concurrent: AtS 433.

AtS 435 Weather Analysis Laboratory
(g) 3 hours spring 3 ②
Selected weather situations, use of weather satellite photographs, introduction to numerical weather prediction. Prerequisite: AtS 434.

AtS 441 Atmospheric Physics (G)
3 hours spring 3 ①
Cloud and precipitation structure and processes, visibility, atmospheric optics. Prerequisite or concurrent: AtS 421.

AtS 443 Radar Meteorology (G)
3 hours spring 3 ①
Microwave electromagnetic propagation in the atmosphere; weather radar analysis to observe precipitation patterns, wind, and flight hazards. Prerequisite: AtS 306. Offered alternate years. Offered 1974-75.

AtS 471 Atmospheric Measurements
(G) 3 hours fall 2 ① 1 ②
Principles of measurement; methods of measuring surface pressure, temperature, humidity, precipitation, wind, and radiation; upper air measurements; laboratory analysis of the response characteristics of single instruments and of instrument systems. Prerequisite: AtS 306.

AtS 482 Elementary Micrometeorology
(g) 3 hours winter 3 ①
Temperature, humidity, and wind and turbulence structure near the ground; topoclimates; soil influences. Prerequisite or concurrent: AtS 300; one year of calculus; Ph 201 or Ph 211.

AtS 491 Introduction to Biometeorology
(G) 3 hours spring 3 ①
Energy budgets near the earth's surface; response of plants, animals, and humans to atmospheric processes. Prerequisite: AtS 482; Bot 201 or GS 103.

AtS 492 Air Pollution Meteorology (g)
3 hours fall 3 ①
Aspects of weather and climate significant for air pollution analysis and control; wind variations in time and space; atmospheric stability and inversions; stagnant anticyclones; atmospheric dispersion equations; patterns of urban pollution dispersion; natural cleansing processes; meteorological factors in plant location, design, and operation. Prerequisite: AtS 300; one year of calculus; Ph 201 or Ph 211.

AtS 501 Research

AtS 503 Thesis

AtS 505 Reading and Conference

AtS 506 Projects

AtS 507 Seminar
Terms and hours to be arranged

AtS 527
Advanced Atmospheric Dynamics
3 hours winter 3 ①
Atmospheric wave motions: wave types: gravity, inertia, and Rossby; quasigeostrophic flow; computation of horizontal divergence and vertical velocity. Prerequisite: AtS 426. Offered alternate years. Not offered 1974-75.

AtS 536 Numerical Weather Analysis and Prediction 3 hours spring 3 ①
Numerical analysis as applied to meteorology: filtering approximations, truncation errors, use of the primitive equations, numerical prediction of the motion and development of major weather systems. Prerequisite: AtS 426, 435. Offered alternate years. Not offered 1974-75.

AtS 581 Atmospheric Dispersion
3 hours winter 3 ①
Dispersion processes: atmospheric turbulence, turbulent diffusion, distribution of windborne material from various sources. Prerequisite: AtS 426. Offered alternate years. Offered 1974-75.

AtS 583 Micrometeorology
3 hours spring 3 ①
Heat, mass, and momentum transfer in the atmospheric boundary layer; statistical theory of turbulence; convection, forced and free; evaporation and diffusion. Prerequisite: AtS 581. Offered alternate years. Offered 1974-75.

AtS 587 Mesometeorology
3 hours spring 3 ①
Mathematical-physical modeling of local wind systems such as lake and sea breezes, slope and valley winds, and convective columns and clouds. Corequisite: AtS 421, AtS 425. Offered alternate years. Offered 1974-75.

AtS 592T Meteorology for Teachers
The laws of motion and thermodynamics which govern various atmospheric circulations such as the general circulation, cyclones, and local wind systems; the influence of man on the atmospheric environment.

AtS 595 Selected Topics in the Atmospheric Sciences
1 2 or 3 hours 1 ① 2 ① or 3 ①
Consent of instructor required.

BIOCHEMISTRY AND BIOPHYSICS

The major in biochemistry and biophysics provides a foundation in both the physical and biological sciences. It is designed to help a student prepare for a career in professions closely related to the health sciences or for further study at the graduate level.

Both undergraduate and graduate students have an opportunity to participate in research guided by a competent and diversified faculty.

In consultation with his adviser, a student can plan his program to gain the necessary orientation and to meet his particular needs.

The undergraduate major in biochemistry and biophysics may emphasize either physical or biological sciences.

A minimum requirement for graduation is 24 hours of approved liberal arts courses, including 6 hours of communications skills (J 111,112; Sp 111,112, 113; or writing courses in addition to Wr 121). Students are encouraged to exceed these minimums. At least one year of German, French, or Russian, or its equivalent by examination is also required. The remaining electives should include, but need not be limited to, advanced courses in the physical and biological sciences. Qualified seniors may elect graduate courses.

Curriculum

Freshman Year

	Hours
General Chemistry (Ch 204,205,206)	15
Mathematics (Mth 110,111,112)	12
English Composition (Wr 121)	3
Physical education (any 3 activity courses)	3
Personal Health (H 160)	2
General Physics I (Ph 211)	4
Electives	9

Sophomore Year

General Biology (Bi 211,212,213)	15
Organic Chemistry (Ch 334,335,336)	9
Mathematics (Mth 113,211)	8
General Physics I (Ph 212,213,214)	12
Electives	4

Junior Year

Biochemistry (BB 490,491,492)	9
Organic Chemistry Lab (Ch 337,338)	4
Genetics (Bi 341)	4
Physical Chemistry (Ch 440,441,442)	9
Electives	22

Senior Year

Biochemistry Lab (BB 493,494,495)	6
Biophysics (BB 481,482,483)	6
Electives	36

Lower Division Course

BB 100 The Molecules of Life
2 hours any term 2 ①
Biochemistry and biophysics for nonscience majors and others. Includes biochemical basis of origin of life, biochemical genetics, relations of biochemical aspects of memory and behavior, mutagenesis, and related topics.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

BB 331,332,333
Introduction to Molecular Biology
3 hours each term 3 ①
For students who desire a descriptive acquaintance with molecular biophysics. Emphasis on various aspects of molecular biology and quantitative approaches to biological problems. Prerequisite: Ch 203 or 206; Mth 102.

BB 350 Elementary Biochemistry
4 hours summer 4 ①
Service course for students desiring a short introduction to biochemistry. Prerequisite: Ch 227 or equivalent.

BB 401 Research

BB 405 Reading and Conference
Terms and hours to be arranged

BB 450,451,452 General Biochemistry (g)
4 hours fall 3 hours winter and spring 4 ① 3 ① 3 ①
Service courses in biochemistry for students with a limited background in physical chemistry. *BB 450,451:* Proteins, amino acids, and enzymes; nucleic acids; carbohydrates, lipids and related topics; metabolism. *BB 452:* special topics. Prerequisite: Ch 228 or equivalent.

BB 461,462 General Biophysics (g)
3 hours each term 3 ①
Service course in biophysics, provides elementary knowledge of important biological interactions and processes as investigated by physical methods. Prerequisite: general chemistry; general physics; calculus.

BB 481,482,483 Biophysics (G)
2 hours each term 2 ①
Quantitative properties of biological systems and biological phenomena using concepts derived from mathematics and physics. Prerequisite: Ch 442.

BB 490,491,492 Biochemistry (G)
3 hours each term 3 ①
Professional course to meet the requirements of majors in biochemistry. Prerequisite: Ch 336, Ch 425,442.

BB 493,494,495
Biochemistry Laboratory (G)
2 hours each term 2 ③
Laboratory to accompany BB 450,451,452 or BB 490,491,492.

Graduate Courses

See also courses marked (g) and (G) above.

BB 501 Research

BB 503 Thesis

BB 505 Reading and Conference

BB 507 Seminar
Terms and hours to be arranged

BB 550,551,552
Selected Topics in Biochemistry
3 hours each term 3 ①
Nonsequence courses designed to acquaint student with recent advances in biochemistry. Topics: Proteins, Nucleic Acids every year. Alternate years: Carbohydrates and Lipids, Intermediary Metabolism, Biological Oxidations, Nutrition, Biochemical Genetics, and Cancer Viruses. Prerequisite: BB 492 or permission of instructor.

BB 553 Plant Biochemistry
3 hours 3 ①
Chemical processes and metabolism in plant systems. Prerequisite: BB 492 or consent of instructor.

BB 554 Plant Biochemistry Laboratory
2 hours spring 2 ③
A laboratory course to accompany BB 553, to demonstrate the use of biochemical tools for studying plant materials. Offered alternate years.

BB 564 Physical Methods in Biophysics and Biochemistry
3 hours spring 3 ①
Important techniques for studying biopolymers and biological systems. Prerequisite: BB 483.

BB 565 Selected Topics in Biophysics
3 hours spring 3 ①
Nonsequence course designed to acquaint student with recent advances in biophysics. Prerequisite: BB 483.

BB 580T
Biochemistry for Science Teachers
3 hours summer 3 ①
Introduction to biochemistry for high school or college teachers. Molecular concepts and fundamentals of biochemistry. Prerequisite: Organic chemistry.

General Biological Science

Courses with a Bi designator will be accepted for major credit by the departments of botany, entomology, general science, microbiology, and zoology.

Lower Division Courses

Bi 50 Premedicine Orientation
1 hour winter 1 ①
Premedical and medical education, career opportunities, social aspects of medicine, basic research and applied medicine. P-N graded. Not available for credit towards degree in biological sciences. ALVARADO.

[1]Bi 211,212,213 Biology
5 hours each term 3 ① 2 ②
211: Plant and animal evolution; genetics; population, community, and ecosystem dynamics. *212:* Behavior: comparative physiology, developmental biology. *213:* Cellular structure and function, microbial systems. Prerequisite: Mth 110; corequisite: Ch 226.

Upper Divison Courses

Bi 341 Genetics
4 hours fall or spring 4 ①
Elements of Mendelian, quantitative, population, developmental, and molecular genetics; behavior of chromosomes and their effects on the phenotype. Prerequisite: general chemistry and biology, botany, or zoology. ROBERTS, DAWSON.

Bi 342 Genetics Laboratory
2 hours winter 2 ③
Experiments demonstrating Mendelian principles, crossing-over, mutation, and other attributes of the genetic material. Prerequisite: Bi 341. ROBERTS, DAWSON.

Bi 360 Cell Physiology
3 hours fall 3 ①
Relationship between structural components and chemical organization of the cell; Bioenergetics, cell morphogenesis, cell permeability, cell replication, cell specialization, and cell senescence. Prerequisite: one year of biological science and organic chemistry. CONTE.

Bi 361 Cell Physiology Laboratory
2 hours spring 1 ③ 1 ①
The dynamic relationship between the structural components of the cell and its internal physico-chemical organization. Prerequisite: Bi 360. CONTE.

Bi 370 General Ecology
3 hours fall or spring 3 ①
The biology of ecosystems: energy, patterns of ecosystems and populations, interspecies interactions, diversity, and development. Prerequisite: one year of biological science. NAGEL, WIENS.

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[1] Credit toward graduation is granted for only one of the following combinations: Z 201,202; Bi 211,212,213; or GS 101,102,103. Bi 211, 212,213 is intended for biological science majors. Other biological sequences are available in the Departments of Biochemistry and Biophysics, Botany, Entomology, General Science, Microbiology, and Zoology.

Bi 371 Ecological Methods
2 hours fall or spring 1 ④
Experimental design, data collection, analysis and synthesis in ecological studies; local ecosystems emphasized. Prerequisite: Bi 370. NAGEL, WIENS.

Bi 425 Developmental Biology (G)
5 hours winter 3 ① 1 ① 1 ③
Cytoplasmic organization, activation, and control of gene expression, induction, cell association; differentiation, including hormone action and immune competence. Techniques of cell culture, enzyme induction, transplantation. Prerequisite: Bi 341; Bi 360 or Bot 331 or Z 431. MORRIS, QUATRANO.

BOTANY

The undergraduate major in botany is intended to qualify students for graduate work in various areas of botany or for positions with the state or federal government or in industries that deal with plants and pesticides. Graduate programs help students qualify for teaching positions in colleges and universities or for research positions in industry or the federal government.

In consultation with his adviser, each botany major prepares a course of study that is reviewed annually to adapt it to the student's background, interests, and career objectives.

The program in pest management for plant protection is offered cooperatively by the Departments of Botany and Entomology and departments of the School of Agriculture. It provides education for the management of plant pests—especially pathogens, weeds, and insects. Students are helped to find summer employment providing practical experience in crop production, pest control, and/or pesticide regulation.

The extensive and diversified research programs of staff in the department are made available for undergraduate experience in research and for specialized graduate training.

Undergraduate majors in botany may be general or may emphasize one of the fields of the graduate majors.

The graduate majors include anatomy, cytology, ecology, forest pathology, genetics, morphology, mycology, nematology, paleobotany, palynology, plant pathology, plant virology, phycology, physiology, physiology of parasitism, systematic botany.

Typical Curriculum

Freshman Year	Hours
General Chemistry (Ch 204,205,206)	15
Mathematics (Mth 110,111,112)	12
English Composition (Wr 121)	3
Approved courses in humanities or social sciences	9
Physical education	3
Officer education or other electives	6

Sophomore Year	
Organic Chemistry (Ch 226,227,228,229)	10
Biology (Bi 211,212,213)	15
Approved courses in communication skills	3
Personal Health (H 160)	2
Botany (Bot 321)	4
Approved courses in humanities or social sciences	9
Officer education or other electives	5

Junior Year	Hours
General Physics (Ph 201,202,203)	12
Approved courses in communication skills	3
General Ecology (Bi 370)	5
Cell Physiology (Bi 360)	3
Cell Physiology Laboratory (Bi 361)	2
Genetics (Bi 341)	4
Genetics Laboratory (Bi 342)	2
Statistics (St 451)	4
Electives	13

Senior Year	
Upper division botany (Bot 331,341,371)	13
Foreign language	9–12
Botany courses in one field of graduate majors	9–13
Electives	10–17

Pest Management Curriculum

Freshman Year	Hours
General Chemistry (Ch 204,205,206)	15
Mathematics (Mth 110,111,112 or other)	12
English Composition (Wr 121)	3
Approved course in humanities or social sciences	9
Physical education	3
Officer education or other electives (Principles of Wildlife Conservation, Wld 251, recommended)	5–3
Pest management seminar (Bot 199)	1

Sophomore Year	
Organic Chemistry (Ch 226,227,228,229)	10
Biology (Bi 211,212,213)	15
Approved course in communication skills	3
Personal health	2
Approved courses in humanities or social sciences	9
Officer education or other electives (Laboratory Techniques in Microbiology (Mb 303 recommended)	5–3
General Horticulture (Hort 215) or Crop Production (ACS 211)	3–5
Pest Management Seminar (Bot 199)	1

Junior Year	
General Physics (Ph 201,202,203)	12
Approved course in communication skills	3
General Ecology (Bi 370)	3
Plant Pathology (Bot 450)	5
Plant Physiology (Bot 331)	5
Applied Entomology (Ent 311)	4
Weed Control (ACS 418)	5
Soils (Sls 210)	5
Genetics (Bi 341)	4
Systematic Botany (Bot 321)	4

Senior Year	
Nematode Diseases of Plants (Bot 550)	4
Plant Protection Entomology (Ent 442)	3
Principles of Insecticide Usage (Ent 441)	3
Plant Breeding (ACS 415)	3
Field Plot Technique (ACS 516)	5
Extension Methods (EM 411)	3
Statistical Methods (St 451)	4
Structure of Seed Plants (Bot 371)	4
Economics (sequence including general, agricultural, and forest economics)	9
Pest Management Seminar (Bot 401) Research	1
Electives	8

Lower Division Courses

Bot 199 Special Studies
Terms and hours to be arranged
An unstructured lower-division course for independent study in various fields of botany. Title of study may be recorded on student's transcript if selected one term before registration for the course.

Bot 201,202,203 General Botany
4 hours each term 2 ① 2 ② 2 ① 2 ② 1 ① 1 ② 1 ③
Bot 201: How plants get their food, grow, differentiate, and reproduce; seed plants; *Bot 202:* Phylogenetic survey of the plant kingdom, morphology; *Bot 203:* Identification of native plants; use of taxonomic keys, floral morphology.

Upper Division Courses
Courses numbered 400-499 and designated (*g*) or (G) may be taken for graduate credit.

Bot 316 Aquatic Plants
4 hours fall 2 ① 2 ③
Ecology, taxonomy, and economic significance. Prerequisite: Bot 203 or equivalent. MCINTIRE, JOHNSTON.

Bot 320
Fungus Deterioration of Wood Products
3 hours winter 2 ① 1 ③
Relation of decay in standing timber to decay of wood products; fungus deterioration of logs, lumber, and manufactured products. Prerequisite: Bot 201,202 or Bi 211,212,213. Offered alternate years. Offered 1974-75. ROTH.

Bot 321 Systematic Botany
4 hours spring 2 ① 2 ③
Vascular plants. Plant classification; collection and identification. Prerequisite: Bot 201,202 or Bi 211,212,213. CHAMBERS.

Bot 330 Introductory Plant Physiology
4 hours winter 3 ① 1 ③
Fundamental concepts of physiological processes. Service course for students majoring in forestry. Prerequisite: Bot 201,202, or equivalent. ZOBEL.

Bot 331 Plant Physiology
5 hours fall or spring 3 ① 2 ③
Physiological processes stressing modern concepts and areas of research. Prerequisite: Bot 201 or Bi 212 or 213; one year of college chemistry. MOORE, QUATRANO.

Bot 341 Plant Ecology
4 hours fall or spring 2 ① 2 ②
Structure, methods of analysis, environmental relations, and dynamics of vegetation. Prerequisite: Bot 203 or Bi 213 and Bi 370, or equivalent. CHILCOTE, ZOBEL.

Bot 371 Structure of Seed Plants
4 hours winter 2 ① 2 ③
Morphology, anatomy, and reproduction. Prerequisite: Bot 201,202, or Bi 213. RICKSON.

Bot 401 Research

Bot 403 Thesis

Bot 405 Reading and Conference

Bot 405 Reading and Conference
Orientation
For botany majors only.

Bot 407 Seminar
Terms and hours to be arranged

Bot 411,412
Morphology of Nonvascular Plants (G)
5 hours fall, winter 3 ① 2 ②
Bot 411: structure, reproduction, and phylogeny of the algae. *Bot 412:* structure, reproduction, and phylogeny of lichens and bryophytes. Prerequisite: three terms of upper division biology. PHINNEY.

Bot 413 Morphology of Vascular Plants
(G) 5 hours spring 3 ① 2 ②
Structure, reproduction, and evolutionary history of vascular plants. Prerequisite: Bot 412 or equivalent. Offered alternate years. Offered 1974-75. DENNIS.

Bot 414 Agrostology (G)
4 hours fall 2 ① 2 ②
Classification and identification of grasses, with emphasis on the relationships among tribes and genera; classical and modern approaches to classification. Prerequisite: Bot 321 or equivalent. CHAMBERS.

Bot 415 Forest Pathology
3 hours winter 2 ① 1 ④
Disease in relation to forest development, protection, and harvest. Prerequisite: Bot 201,202. ROTH.

Bot 421 Advanced Systematic Botany
(G) 5 hours winter 2 (1½) 1 ②
Evolutionary approach: causes of plant variation; ecotypes; genetic isolation and hybridization; modes of speciation; aneuploidy, polyploidy, and apomixis; structural hybridity of chromosomes; breeding systems in plant populations; special techniques in botanical systematics. Prerequisite: Bi 341; Bot 321; or equivalents. CHAMBERS.

Bot 425 Plant Taxonomy (g)
3 hours spring 2 ③
Use of taxonomic keys; floral structure, relationships and diagnostic characteristics of vascular plants. Prerequisite: Bot 203 or equivalent. JOHNSTON.

Bot 431 Bioenergetics of Plants (G)
3 hours fall 3 ①
The function of membranes and various plant organelles such as the mitochondrion, glyoxysome, Golgi apparatus, endoplasmic reticulum, etc. Topics include mechanisms of energy conversion and stabilization in association with the metabolic activities of plant organelles, and the utilization of energy by plants. Prerequisite: Bot 331 or Bi 360. Offered alternate years. Offered 1974-75. BISHOP.

Bot 432 Photobiology of Plants (G)
3 hours winter 3 ①
Detailed physiological and biochemical coverage of the photobiology of plants. Topics include: Photosynthesis: Whole cells and chloroplast reactions; phototaxis; photokinesis and photodinesis. Prerequisite: Bi 331 or Bi 360. BISHOP.

Bot 433 Hormonal Regulation of Plant Growth and Development (G)
3 hours spring 3 ①
Roles of hormones, inhibitors, and phytochrome in the regulation of growth and development of seed plants. The biochemistry of growth substances and phytochrome; effects of physical environment upon specific growth and developmental events and the salient biochemical changes correlated with those events. Prerequisite: Bot 330 or Bot 331. T. MOORE.

Bot 441,442,443 Advanced Plant Ecology (G)
3 hours each term 2 ① 1 ③
Fall: environmental factors affecting plant growth. *Winter:* the plant community, its structure, development, classification, and interpretation. *Spring:* methods in vegetation sampling and analysis. Prerequisite: Bot 341 or equivalent. ZOBEL, CHILCOTE.

Bot 450 Plant Pathology (g)
5 hours spring 3 ① 2 ③
Infectious and non-infectious plant diseases, nature of pathogens and pathogenesis, influence of environment, and principles of control. Prerequisite: Bot 202, and either 331 or 330 recommended. LEACH and staff.

Bot 451 Plant Disease Diagnosis (G)
3 hours summer 1 ④ 1 ②
Field trips and laboratory on plant disease identification and control. Prerequisite: Bot 450 or equivalent. Offered alternate years. Offered 1974-75. HORNER.

Bot 453 Epidemiology and Disease Control (G)
5 hours winter 3 ① 2 ③
Quantitative epidemiological analysis of plant diseases and relationship to disease control. Prerequisite: Bot 450 or equivalent. Offered alternate years. Offered 1974-75. POWELSON.

Z 454 Principles of Symbiosis (G)
4 hours spring 2 ① 2 ②
See ZOOLOGY.

Bot 461 Mycology (G)
4 hours fall 2 ① 2 ③
Biology of fungi: the structure, function, and ecology of yeasts, molds, mushrooms, and other fungi. Prerequisite: two terms of upper division biology. DENISON.

Bot 462 Mycology (G)
5 hours winter 3 ① 2 ③
Classification of fungi; techniques of collection and preservation; literature of mycological taxonomy. Prerequisite: Bot 461 or equivalent. DENISON.

Bot 463 Selected Topics in Mycology (G)
1 2 or 3 hours 1 ① 2 ① or 3 ①
Prerequisite: Bot 461 or 462. DENISON.

Bot 470 Microtechnique (G)
4 hours winter 3 ③
Preparation of permanent microscope slides of plant materials emphasizing techniques of cytochemistry, histochemistry, and autoradiography. Prerequisite: Bot 201 or Bi 213, and two terms of upper division biology. RICKSON.

Bot 471 Plant Anatomy (G)
4 hours fall 2 ① 2 ③
Origin, structure, and development of plant tissues. Prerequisite: Bot 371 or Bi 213, and two terms of upper division botany. RICKSON.

Bot 472 Plant Cytology (G)
4 hours spring 3 ① 1 ②
Cell ultrastructure; nucleus, nucleolus, golgi, cell wall, plastids, endoplasmic reticulum, microbodies, and other organelles. Prerequisite: Bot 201 or Bi 213, and two terms of upper division botany. Offered alternate years. Offered 1974-75. RICKSON.

Bot 490 Paleobotany (G)
4 hours spring 2 ① 2 ③
Stratigraphic distribution, phylogeny, structure, and classification of representative fossil plants. Prerequisite: Bot 413 or G 430 or equivalent. Offered alternate years. Not offered 1974-75. DENNIS.

Graduate Courses

See also courses marked (g) and (G) above.

Bot 501 Research

Bot 503 Thesis

Bot 505 Reading and Conference
Terms and hours to be arranged

Bot 507 Seminar
1 hour each term

Bot 511 Fresh-Water Algae
4 hours spring 2 ① 2 ③
Taxonomy and ecology. Prerequisite: Bot 411 or Z 451. PHINNEY.

Bot 512 Marine Algae
4 hours spring 2 ① 2 ③
Taxonomy and ecology. Prerequisite: Bot 411 or Z 451. PHINNEY.

Bot 515 Forest Pathology
3 hours winter 2 ① 1 ③
Forest disease problems; organized to meet individual needs of students in biology and forestry. Prerequisite: Bot 415 or Bot 450 or consent of instructor. Offered alternate years. Not offered 1974-75. ROTH.

Sls 522 Plant-Water Relations
3 hours spring 3 ①
See SOIL SCIENCE.

Bot 531 Research Methods in Bioenergetics and Photosynthesis
2 hours winter 2 ③
Companion course for Bot 431 and 432 intended primarily for majors in plant physiology. Techniques for generation and measurement of light, for measurement of photosynthesis, for chloroplast analysis, and for isolation of and measurements on plant organelles. Small groups to perform individual experiments. Independent projects will also be completed by students. Prerequisite or corequisite: Bot 431 or 432. BISHOP.

Bot 532 Research Methods in Plant Growth and Development
2 hours spring 2 ③
Companion course for Bot 433 and 531 intended primarily for majors in plant physiology. Assigned and independent investigations of hormones, inhibitors, pigment systems and environmental factors in higher plants, unique plant systems to study the biochemical basis of differentiation. Prerequisite or corequisite: Bot 433. T. MOORE, QUATRANO.

Bot 534 Mineral Metabolism
3 hours winter 2 ① 1 ③
Mineral elements in metabolic processes; ion accumulation in cells. Prerequisite: BB 450. EVANS.

Bot 541 Plant Geography
3 hours winter 2 ① 1 ③
Origin, development, and distribution of major units of vegetation, with emphasis on western United States. Prerequisite: Bot 321,341,441. CHILCOTE.

G 543 Palynology
4 hours spring 2 ① 2 ③
See GEOLOGY.

Bot 551 Plant Virology
3 hours fall 2 ① 1 ③
Nature and properties; symptomology; transmission, inhibitors; purification; electron microscopy; serology; control. Prerequisite: Bot 450; 6 hours of upper division biology. Offered alternate years. Not offered 1974-75. ALLEN.

Bot 552 Bacterial Diseases of Plants
5 hours winter 2 ① 2 ④
Biology and identification of causal agents; symptoms, etiology, and control. Prerequisite: Bot 450; Mb 303 Offered alternate years. Not offered 1974-75. L. MOORE.

Bot 554 Nematode Diseases of Plants
4 hours fall 2 ① 2 ②
Nematology, identification and biology of nematodes, symptoms and control. Prerequisite: Bot 450 or equivalent and 6 hours of upper division biology. Offered alternate years. Offered 1974-75. JENSEN.

Bot 560 Fungicides
3 hours winter 2 ① 1 ③
Chemical control of plant diseases, mode of action. Prerequisite: Bot 450 or equivalent; organic chemistry. Offered alternate years. Offered 1974-75. CORDEN.

Bot 564 Physiology of Fungi
5 hours spring 3 ① 2 ③
Fungus growth, reproduction, survival; their raw materials, metabolism, products; chemical and physical agents; variation. Prerequisite; plant physiology or equivalent; organic chemistry. Offered alternate years. Offered 1974-75. TRIONE.

Bot 566 Physiology of Parasitism
4 hours winter 2 ① 2 ③
Recent advances in specific fields in plant diseases. For advanced graduate students. Topics covered include: infection, tissue maceration, toxins, wilting, abnormal plant growth, and plant disease resistance. Prerequisite: Bot 433; BB 451 or equivalent. Offered alternate years. Not offered 1974-75. CORDEN.

Bot 567 Electron Microscopy Laboratory in Botany
3 hours any term 3 ②
Botanical applications of the electron microscope, specimen preparation, and photographic techniques. For botany major only. Prerequisite: Z 566 and approval of the instructor. ALLEN.

Bot 570 Cytological Microtechnique
4 hours spring 3 ③
Preparation of slides for study of chromosomes during mitosis, meiosis, and pollen tube formation; smear techniques. Prerequisite: Bot 470 or equivalent. RICKSON.

Bot 573 Plant Cytogenetics
4 hours winter 3 ① 1 ②
Effects of variations in chromosome structure and number. Prerequisite: Bi 341; Bot 472.

Bot 580 Biological Micrography
3 hours winter 1 ① 2 ③
Applying optical research tools to various types of biological materials and problems. Prerequisite; graduate standing in biological science. PHINNEY.

CHEMISTRY

A major in chemistry may serve the undergraduate student as preparation for professional work in chemistry, as a core for preprofessional training in a field such as medicine or dentistry, or as an area of concentration in a liberal arts program. The student may choose intensive study in one of the classical fields of chemistry—analytical, inorganic, organic, or physical—or in a related field of special interest such as agricultural chemistry or biochemistry. Electives may be in the humanities and social sciences.

The major in chemistry helps students prepare (1) for graduate work in pure or applied chemistry, (2) for positions with the federal government, (3) for teaching positions in universities, colleges, community colleges, and high schools, (4) for positions as research chemists and technical experts in commercial laboratories and chemical industries, or (5) for positions as chemists in laboratories of agricultural experiment stations or in industries specializing in the manufacture of food or agricultural products.

The facilities, faculty, and curricular offerings of this department are approved by the American Chemical Society. Graduates are eligible for certification by the chairman of the department to become members of the Society after two years of professional experience.

The chemistry "core" curriculum consisting of general, organic, analytical, physical, and inorganic chemistry course work plus three years of laboratory work in chemistry, is normally completed by the end of the junior year, except for two terms of inorganic chemistry taken in the senior year. The remainder of the program consists of 15 term hours of approved career-supportive electives, of which at least 6 are to be in laboratory courses or research. Students planning to do graduate work will normally do thesis research and take advanced courses in chemistry and closely related disciplines. Those intending to take employment after graduation, may select from a wide variety of courses in many disciplines to fit their professional objectives and enhance employability.

The graduate majors are analytical chemistry, inorganic chemistry, organic chemistry, physical chemistry, and nuclear and radiation chemistry.

An undergraduate major in chemistry may emphasize one of the graduate majors or biochemistry.

Curriculum

Freshman Year	Hours
General Chemistry (Ch 204,205,206)	15
Mathematics (Mth 110,111,112)	12
General Physics I (Ph 211)	4
English Composition (Wr 121)	3
[1]Selected required courses	5
Physical education	3
[2]Elective	3

Sophomore Year	
Organic Chemistry (Ch 334,335.336)	9
Experimental Chemistry I (Ch 251,252,253)	6
Analytical Chemistry (Ch 320)	3
Approved courses in communication skills	3
Mathematics (Mth 113,211,321)	12
General Physics(Ph 212,213,214)	12
Personal Health (H 160)	2
[1]Selected required courses or [2]elective	4

Junior Year[3]	
Analytical Chemistry (Ch 422)	5
Physical Chemistry (Ch 440,441,442)	9
Experimental Physical Chemistry (Ch 443, 444)	4
Approved courses in communication skills	3
[1]Selected required courses	18–22
[4]Electives	12–8

Senior Year	
Inorganic Chemistry (Ch 411,412)	6
[1]Selected required courses	8–9
[4]Electives	18
Approved career supportive electives	15

[1] Required courses which may be taken in any order include: (a) 18 hours of approved humanities and/or social sciences, (b) 9 hours of approved biology courses (students with one year of high school biological science may petition to reduce this to 5 term hours), (c) 12 hours of German, Ger 50,51,52.

[2] Officer education may be elected in the freshman and sophomore years or taken at a later time.

[3] In 1975-76, Ch 422 will be reduced to 3 hours; Ch 443,444 will be replaced with Ch 351,352,353, 6 hours.

[4] Students emphasizing biochemistry should include 9 hours of approved life sciences.

Lower Division Courses

[1]Ch 104,105,106 General Chemistry
5 hours first term 4 hours second and third terms 5 ① 3 ① 1 ③
A nonterminal service course for students who have had no previous training in chemistry and for those whose college aptitude test scores indicate a need for a more elementary introduction to chemistry. This sequence and Ch 107 will allow students to take advanced laboratory courses in chemistry.

Ch 107 General Chemistry Laboratory
2 hours fall 2 ③
Laboratory work to complete the instruction given in Ch 104,105,106 and to prepare students for more advanced laboratory training in chemistry. Prerequisite: Ch 106.

[1]Ch 201,202,203 General Chemistry
3 hours each term 3 ① 2 ① 1 ③
Service course covering basic principles of general chemistry. Prerequisite: one year of high school chemistry and acceptable college aptitude scores. This sequence and Ch 207 will allow students to take advanced laboratory courses in chemistry.

Ch 204,205,206 General Chemistry
5 hours each term 3 ① 2 ③
Professional course for students majoring in chemistry, pharmacy, and related sciences. Prerequisite: one year of high school chemistry and acceptable college aptitude scores.

Ch 207 General Chemistry Laboratory
2 hours fall 2 ③
Laboratory to complete the instruction given in Ch 203 and to prepare students for more advanced laboratory training in chemistry. Prerequisite: Ch 203.

Ch 226,227,228 Organic Chemistry
3 hours fall and winter, 2 hours spring 3 ① 3 ① 2 ①
Service course covering aliphatic and aromatic chemistry. Prerequisite: Ch 106,203, or 206.

Ch 229 Organic Chemistry Laboratory
2 hours spring or fall 2 ③
A laboratory course in organic chemistry for non-majors. Prerequisite: Ch 107 or Ch 207; Ch 227.

[1]Ch 234 Quantitative Analysis
4 hours any term 2 ① 2 ③
Service course on classical and instrumental analytical techniques for students in the life sciences. Prerequisite: Ch 206, or corequisite: Ch 107 or 207.

Ch 235 Quantitative Chemistry
4 hours winter 1 ① 2 ② 1 ③
Equilibrium and stoichiometric calculations and a limited range of analytical laboratory skills appropriate to the life sciences. Prerequisite: Ch 206, Ch 107, or Ch 207. HAWKES.

Ch 251,252,253 Experimental Chemistry
2 hours each term 2 ④
First integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic, organic, physical, and radiochemistry. Prerequisite: Ch 206, 107, or 207. Corequisite: Ch 334, 335,336,320, or equivalent.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Ch 316 Nuclear Reactor Chemistry
3 hours winter 2 ① 1 ③
Basic principles of nuclear and radiation chemistry as applied to nuclear reactors. Processing of reactor fuels, corrosion, waste disposal and treatment, analysis of low-level radioactivity.

[1]Ch 320 Analytical Chemistry I
3 hours spring 3 ①
First course of a two-course professional sequence (Ch 320,422) for majors in chemistry. Determination of the composition of simple and complex mixtures. Sample preparation, separations, optical and electrical instruments, optimization of instrumental and other variables, and treatment of data. Prerequisite: Ch 206,107, or 207.

[1] Certain courses cover somewhat similar subject matter, and credit cannot be granted for duplication. For any sequence or combination of general chemistry courses the terminal course being Ch 203, a maximum of 9 term hours is allowed; the terminal course being Ch 206, a maximum of 15 term hours is allowed. Credit cannot be granted for more than one of Ch 234, Ch 235, and Ch 320.

Ch 334,335,336 Organic Chemistry
3 hours each term 3 ①
Professional course designed to meet the requirement of majors in chemistry and chemical engineering. Prerequisite: Ch 106 or Ch 203 or 206.

Ch 340 Elementary Physical Chemistry
3 hours spring 3 ①
Aspects having application in engineering, biological sciences, and medicine. Mathematics minimized. Some knowledge of physics required. Prerequisite: Ch 106 or 203 or 206.

Ch 351,352,353
Experimental Chemistry
2 hours each term 2 ④
Second integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic, organic, physical, and radiochemistry. Prerequisite: Ch 253, 320, 336. Corequisite: Ch 440, 441, 442, 422, or equivalent. Not offered 1974-75.

Ch 370,371,372 Glass Blowing
1 hour each term 2 ②
Manipulation of glass and assembling setups. May be started any term.

Ch 399
The Chemist in Contemporary Society
1 hour fall 1 ①
Coordination of chemical background and the individual's goals; current research interests and chemical applications to technological problems. For chemistry majors. Graded on P-N basis. Prerequisite: one year of college chemistry. Corequisite: second-year college chemistry.

Ch 401 Research

Ch 403 Thesis

Ch 405 Reading and Conference

Ch 407 Seminar
Terms and hours to be arranged

Ch 411,412,413 Inorganic Chemistry
(G) 3 hours each term 3 ①
Structure and bonding of inorganic compounds, chemistry of non-transition elements from the standpoint of the periodic table and atomic structure, ligand field theory and descriptive chemistry of transition metal compounds. Prerequisite: three years of college chemistry.

Ch 414 Inorganic Laboratory (G)
1 hour spring 1 ③
Laboratory techniques for the synthesis and characterization of inorganic compounds. Prerequisite: Ch 411 or graduate standing.

Ch 416 Nuclear Chemistry (G)
3 hours 3 ①
Radioactive decay, nuclear properties, nuclear structure, alpha, beta, and gamma decay, nuclear reactions, fission, interaction of radiation with matter, chemical techniques, radiation safety and nuclear instrumentation. Corequisite: Ch 440 or Ph 311.

Ch 418 History of Chemistry (G)
3 hours 3 ①
Chemical theories and laws. Prerequisite: three years of chemistry.

Ch 419 Radioactive Tracer Methods
(G) 4 hours. 2 ① 2 ③
Radiochemistry, radioisotopes, radioactivity, radiotracer methods as research tool in physical and biological science. Prerequisite: two years of college chemistry.

Ch 421 Analytical Chemistry (g)
4 hours winter 2 ① 2 ③
Professional course for majors in chemical engineering. Electrical, optical, and mechanical instruments assembled and applied to quantitative chemical measurements. Prerequisite: Ch 206. INGLE.

Ch 422 Analytical Chemistry II (g)
3 hours 3 ①
Second course of a two-course professional sequence (Ch 320,422) for majors in chemistry. Determination of the composition of simple and complex mixtures. Sample preparation, separations, assembly and use of optical and electrical instruments, optimization of instrumental and other variables, and treatment of data. (This becomes a 3-hour lecture course 1975-76). Prerequisite: Ch 320.

Ch 423,424,425
Introduction to Physical Chemistry
(g) 3 hours each term 3 ①
Service course covering thermodynamics, electrochemistry, kinetics, molecular structure, colligative properties, surface chemistry, macromolecules. Prerequisite: Mth 112 or equivalent; one year of college chemistry; one year of college physics.

Ch 426 Chemical Microscopy (G)
3 hours spring 1 ① 2 ③
Theory and use of microscope in microscopic measurements, quantitative analysis of mixtures, identification of organic compounds, optical crystallization phenomena, etc. Prerequisite: three years of college chemistry; college physics. WILLIAMS.

Ch 428 Instrumental Analysis (g)
4 hours fall 2 ① 2 ③
Service course for the nonspecialist outside the field of chemistry covering a broad spectrum of analytical instrumentation. Prerequisite: senior or graduate standing. WILLIAMS.

Ch 430,431,432
Advanced Organic Laboratory (G)
3 hours each term 1 ① 2 ③
Spectroscopic methods in organic structure analysis, counter current separation techniques, high pressure reactions, and selected syntheses. *Ch 432:* semi-micro analysis of mixtures. Prerequisite: Ch 338,442.

Ch 434 Organic Preparations (G)
1 or 2 hours each term 5-hour maximum
1 ③ 2 ③
Important methods of synthesis, such as Grignard's, Friedel-Craft's, Perkin's reaction, and others. Prerequisite: Ch 338 or equivalent.

Ch 437,438
Survey of Organic Chemistry (G)
3 hours each term 3 ①
For advanced undergraduates or graduate students who have not passed the organic orientation examination. Special emphasis on the application of physical chemical principles to understanding of organic reactions. Prerequisite: Ch 336,442.

Ch 440,441,442 Physical Chemistry
(g) 3 hours each term 3 ①
Theoretical chemistry, thermodynamics, properties of gases, liquids, and solids; solutions; chemical equilibrium, reaction kinetics, atomic and molecular structure. Prerequisite: Mth 211; Ph 213. HEDBERG.

Ch 448,449
Colloid and Surface Chemistry (G)
3 hours each term 3 ①
Classical and modern surface theory, absorption, membrane and bulk diffusion, nucleation and Donnan potential, lyophilic and lyophobic colloids, including proteins and clays. Prerequisite: three years of college chemistry. SLABAUGH.

Ch 450
Introductory Quantum Chemistry (G)
3 hours fall 3 ①
Elementary wave mechanics and matrix mechanics of atoms and molecules. Quantum basis of chemical structure. Prerequisite: Mth 211; Ph 213.

Ch 467 Molecular Spectroscopy (G)
3 hours 2 ① 1 ③
Infrared, Raman, Electronic, N.M.R. and E.S.R. spectroscopy; identification and analysis applications, determination of molecular structures and other molecular parameters. Prerequisite: Ch 442.

Ch 468 Chemical Kinetics (G)
3 hours 3 ①
Reaction rates, experimental methods, elementary processes, complex inorganic reactions, complex organic reactions, catalysis, general theories, and potential energy surfaces. Prerequisite: Ch 442. KRUEGER.

Ch 469 Electrochemistry (G)
3 hours 3 ①
Theoretical electrochemistry of solutions. Electrolytic transport, thermodynamics of cells, electrode kinetics. Prerequisite: Ch 442. SCOTT.

Ch 480,481
Survey of Physical Chemistry (G)
3 hours each term 3 ①
An elementary introduction to modern concepts of molecular structure and the properties of molecules for advanced chemistry students not majoring in physical chemistry. Prerequisite: Ch 442. FREDERICKS.

Ch 482,483 Thermodynamics (G)
3 hours each term 3 ①
Chemical principles from standpoint of thermodynamics. Prerequisite: Ch 442. SCOTT, HEDBERG.

Ch 484 Irreversible Thermodynamics
(G) 3 hours 3 ①
Application of thermodynamics to physico-chemical systems not at equilibrium, transport of heat and matter, electrolytic transport in fluids and solids, chemical reactions. Prerequisite: Ch 483. FREDERICKS.

Graduate Courses
See also courses marked (g) and (G) above.

Ch 501 Research

Ch 503 Thesis

Ch 505 Reading and Conference
Terms and hours to be arranged

Ch 507 Seminar
Terms and hours to be arranged
A reading knowledge of German and French is expected.

Ch 511,512,513
Selected Topics in Inorganic Chemistry
3 hours each term 3 ①
Nonsequence courses designed to acquaint the advanced graduate student with recent advances in fields such as spectroscopy and magnetism, chemistry of coordination compounds, kinetics and mechanisms of inorganic reactions, acid-base theory and reactions in non-aqueous solvents, and chemistry of the less familiar elements. Prerequisite: Ch 413 or passing scores on the graduate inorganic qualifying examination.

Ch 515
Experimental Nuclear Chemistry
3 hours spring 1 ① 2 ③
Individualized instruction in experimental nuclear chemistry and activation analysis. Advanced activation analysis, nuclear spectroscopy, nuclear reaction studies, radio-chemistry, advanced radiotracer methodology, and low-level techniques. Original research problem. Prerequisite: Ch 416 or Ch 419 or Ch 528.

Ch 520,521,522
Advanced Analytical Chemistry
3 hours each term 3 ①
Physical chemical principles underlying separations and modern methods of analytical chemistry measurements. Prerequisite: Ch 442. FREUND, PIEPMEIER.

Ch 524,525,526
Advanced Instrumental Analysis
3 hours each term 1 ① 2 ③
Electrical, optical, and mechanical analytical instruments systems, critical study of principles and performance; special topics in spectrochemical, electrochemical, and gas chromatographic methods of analysis; automatic, continuous, and remote methods of analysis, telemetry, data acquisition and storage. Prerequisite: Ch 442. FREUND.

Ch 527
Advanced Radiotracer Methodology
3 hours spring 1 ① 2 ③
Radiotracer experiments, synthesis and degradation of labeled compounds; advanced instruments for radioactivity measurement; tritium as a radiotracer; liquid scintillation mechanism; recent advancement. Prerequisite: three years of college chemistry.

Ch 528 Activation Analysis
3 hours winter 2 ① 1 ③
Theory; various methods of activation emphasizing neutron activation, fundamentals of radioactivity detection, instrumental and radiochemical methods; applications to physical, chemical, biological, geochemical fields, etc. Instrumentation and laboratory techniques include use of beta-, gamma-ray detectors, and use of multichannel analyzers. Prerequisite: Ch 419 or senior standing in chemistry or physics, or graduate standing in biological science or earth science.

Ch 530,531,532
Advanced Organic Chemistry
3 hours each term 3 ①
Reaction mechanisms, stereoisomerism, conformation analysis, and advanced methods of synthesis. Prerequisite: passing grade in graduate qualifying examination or Ch 437,438.

Ch 536,537,538
Selected Topics in Organic Chemistry
3 hours each term 3 ①
Nonsequence courses designed to acquaint student with recent advances in organic chemistry and their application to special fields of study. Topics covered vary from term to term and year to year. (Consult department for specific information regarding a given term.) Topics include: (1) Theoretical Organic Chemistry, (2) Recent Advances in Reaction Mechanisms, (3) Advanced Synthesis, (4) Free Radical Reactions, (5) Organic Sulfur Chemistry. Prerequisite: Ch 532 or its equivalent.

Ch 540,541,542
Advanced Physical Chemistry
3 hours each term 3 ①
Atomic and molecular structure, chemical bond, thermodynamic functions. Prerequisite: Ch 442. DECIUS.

Ch 543,544,545
Selected Topics in Physical Chemistry
2 hours each term 2 ①
Topics in molecular structure, spectroscopy, crystallography, and physical chemistry of solids. Not all topics covered each year.

Ch 546 Chemical Literature
1 hour 1 ①
Use; character of various chemical journals, dictionaries, reference books, and other sources of information.

Ch 547,548,549 Solid State Chemistry
2 hours each term 2 ①
Elementary crystallography; free-electron, band, and valence-bond theories; thermodynamics of perfect, imperfect, and impure crystals; equilibria involving lattice defects; dislocations, ionic diffusion and conduction; dependence of physical properties of crystals upon chemical constitution. Prerequisite: Ch 442 or graduate standing in physics or engineering. SCOTT, FREDERICKS.

Ch 563,564,565
Selected Topics in Analytical Chemistry
2 hours each term 2 ①
Nonsequence courses designed to acquaint the advanced graduate student with recent advances in analytical chemistry. Prerequisite: Ch 522 or Ch 526.

Ch 566,567,568 Selected Topics in Nuclear and Radiation Chemistry
2 hours each term 2 ①
Nuclear structure and nuclear models, nuclear reactions and nuclear fission, cosmochemistry, radiation and photochemistry. Prerequisite: Ch 416,540.

Ch 583 Photochemistry
2 hours fall 2 ①
Theoretical and experimental aspects of the chemistry of excited species. Of interest to students of chemical kinetics and mechanisms of inorganic and organic reactions. Prerequisite: Ch 336, Ch 440.

Ch 584 Radiation Chemistry
2 hours winter 2 ①
Theoretical and experimental aspects of the chemical changes caused by high-energy radiation. Prerequisite: Ch 336,440.

COMPUTER SCIENCE

Computer science is concerned with the representation, storage, manipulation, and presentation of information. The program of study at OSU emphasizes computer languages, theory of computation, numerical analysis, computer design, artificial intelligence, and simulation.

The facilities of the OSU Computer Center, including computational and consulting services and research basic to computers and computer systems, support the curricular program for the major in computer science.

The B.A. and B.S. degree programs provide a broad background in computer science together with specialization in one branch of the field. Advanced degree programs help in preparation of teachers and researchers for universities, laboratories, and industries. See GRADUATE SCHOOL for M.S., M.A., and Ph.D. degree requirements.

To supplement the major in computer science, a joint program or minor in a related area, such as mathematics, statistics, electrical and computer engineering, business administration, or oceanography, is strongly recommended.

Curriculum

Freshman Year	Hours
Computer Science (CS 211)	4
Mathematics (Mth 110,111,112)	12
Approved courses in biological science	9
Approved courses in humanities or social sciences	9
English Composition (Wr 121)	3
Physical education and personal health	4
Electives (see requirements below)	8

Sophomore Year	
Computer Science (CS 212,213)	8
Mathematics (Mth 113,211,241)	12
Approved courses in physical science	9
Approved courses in humanities or social sciences	9
English Composition (Wr 222) or other approved communications course	3
Electives (see requirements below)	15

Junior Year	
Computer science or mathematics (see requirements)	15–24
English Composition (Wr 323) or other approved communications course	3
Electives (see requirements)	21–30

Senior Year	
Computer science or mathematics	18
Electives (see requirements)	30

Requirements

Lower Division: a year of calculus, a term of linear algebra, several introductory computer science courses.

Upper Division: At least 36 term hours of computer science-related courses, including CS 311, 312,313,321; Mth 358 and two terms of analysis or algebra; and a required senior sequence in one of the following special areas:

Programming: CS 411,412,413 (required)
CS 431,432; Mth 359; St 417 (optional)

Numerical Analysis: Mth 311,341,359,451,452, 453 (required)
Mth 342 (optional)

Theory of Computation: CS 421,422,423 (required)
EE 521,522,523 (optional)

Computer Architecture: EE 525,526,527 or EE 473,474 (required)
CS 341; EE 371,372/521,522,523 (optional)

A student must have a GPA of 2.00 or higher in the required senior sequence and in upper division computer-science-related courses.

Students transferring from other departments must have a GPA of 2.50 or higher in mathematics and computer science courses.

The biological science requirement may be reduced to 5 hours by petition for students taking B.S. or B.A. degrees in both computer science and a second department if they had a year of biology in high school.

Lower Division Courses

CS 101
The Nature of Digital Computers
4 hours 3 ① 1 ①
The historical development of digital computers, how computers work, an introduction to a conversational language, programs and flow charts, algorithms, social and technological implications of computers. Prerequisite: Mth 95 or placement in Mth 101 or higher. (Not for computer science majors).

CS 211
Introduction to Computer Science
4 hours 3 ① 1 ①
Algorithms, flow charts, and basic programming concepts; model of a computer; programming in a conversational language; discussion of capabilities, limitations, and abuses of computers; computer applications. Prerequisite: placement by adviser.

CS 212 Computer Organization
4 hours 3 ① 1 ①
Logical organization, computer hardware, introduction to machine language programming. Prerequisite: CS 211.

CS 213 Introduction to Symbolic Language Programming FORTRAN
4 hours 3 ① 1 ①
Computer applications and elementary FORTRAN. Prerequisite: CS 211 or previous programming instruction.

CS 217
Introduction to COBOL Programming
4 hours 4 ①
Applying the ANSI COBOL language to commercial problems usually characterized by the need to process large files of data. Thorough treatment of language elements, file structures, and I/O considerations. Prerequisite: CS 213.

Upper Division Courses

CS 311
Symbolic Language Programming
4 hours 3 ① 1 ①
More advanced work with symbolic languages. Prerequisite: CS 212,213.

CS 312
Assembly Language Programming
4 hours 3 ① 1 ①
Assembly language programming for a typical computer. Prerequisite: CS 212.

CS 313 Data Structures
4 hours 3 ① 1 ①
Data Bases; their structure, processing, and transformation. Special attention to lists and trees. Prerequisite: CS 312.

CS 321 Introduction to the Theory of Computation
3 hours 3 ①
Turing machines, finite automata, and formal languages. Prerequisite: CS 213.

CS 341 Logic and Boolean Algebra
3 hours 3 ①
Sentences, quantifiers, truth functions; the sentential calculus, Boolean algebra. Prerequisite: any 6 hours from Mth 312, Mth 333-348, Phl 321,322.

Mth 358,359
Introduction to Numerical Calculus
3 hours each term 3 ①
See MATHEMATICS.

EE 371,372
Switching and Coding Systems
4 hours each term 4 ①
See ELECTRICAL AND COMPUTER ENGINEERING.

CS 401 Research

CS 405 Reading and Conference

CS 406 Projects

CS 407 Seminar
Terms and hours to be arranged

CS 411,412,413 Systems Programming
(G) 3 hours each term 3 ①
Theory and construction of monitors, interpreters, simulators, assemblers, and compilers. Prerequisite: CS 311,312,313; St 417.

St 417 Computer Simulation
3 hours 3 ①
See STATISTICS.

CS 421,422,423 Theory of Computation
(G) 3 hours each term 3 ①
Turing machines, recursive functions, finite state automata, and formal languages. Prerequisite: CS 321.

CS 431,432 Data Systems Analysis (G)
3 hours each term 3 ①
Role of systems analysis, data systems development and design, equipment selection and application, data systems implementation. Prerequisite: CS 212,213.

Mth 451,452,453 Numerical Calculus
(G) 3 hours each term 3 ①
See MATHEMATICS.

Mth 487,488,489
Numerical Methods for Scientists (g)
3 hours each term 3 ①
See MATHEMATICS.

EE 473,474 Computer Engineering: System Design and Organization (G)
4 hours each term 4 ①
See ELECTRICAL AND COMPUTER ENGINEERING.

Graduate Courses

CS 501 Research

CS 503 Thesis

CS 505 Reading and Conference

CS 506 Projects

CS 507 Seminar
Terms and hours to be arranged

EE 521,522,523
Switching Theory and Automata
3 hours each term 3 ①
See ELECTRICAL AND COMPUTER ENGINEERING.

EE 525,526,527 Computer Systems
3 hours each term 3 ①
See ELECTRICAL AND COMPUTER ENGINEERING.

CS 531,532 Artificial Intelligence
3 hours each term 3 ①
Pattern recognition methods and applications, feature extraction and selection, general multilayered learning machines in the sense of Bongard. Consent of instructor required.

CS 551,552
Algorithmic Theory and Applications
3 hours each term 3 ①
Post's Tag systems; problems of encoding; the fixed word-length stored program computer; list processors, unsolvability. Prerequisite: CS 423. Offered alternate years. Not offered 1974-75.

CS 554 Formal Languages
3 hours 3 ①
Advanced work in formal languages and grammars. Prerequisite: CS 423. Offered alternate years. Offered 1974-75.

CS 555 Cybernetics
3 hours 3 ①
Study of control and communication in the animal and the machine. Consent of instructor required. Offered alternate years. Offered 1974-75.

DENTISTRY AND DENTAL HYGIENE

DENTISTRY

The School of Science offers a three-year predental curriculum which satisfies the requirements set by the Council on Dental Education of the American Dental Association for admission to University of Oregon Dental School in Portland or other standard dental school. Students completing the three-year curriculum may qualify for a bachelor's degree from Oregon State after one year at dental school. A combined predental and pharmacy curriculum is available through the School of Pharmacy.

Counselors for predental students are Dr. D. J. Griffiths, Associate Professor of Physics, chairman; Dr. H. D. Reese, Associate Professor of Chemistry; Dr. W. C. Johnson, Assistant Professor of Biochemistry and Biophysics; and Dr. Ken Johnson, D,M.D.

Curriculum

Freshman Year	*Hours*
General Chemistry (Ch 204,205,206)	15
Anal Geometry and Calculus (Mth 110, 111,112)	12
English Composition (Wr 121)	3
Approved humanities or social sciences	9
Physical education	3
Officer education or other electives	6

Sophomore Year

[1] Organic Chemistry (Ch 226,227,228,229)	10
Biology (Bi 211,212,213)	15
Approved courses in communication skills	3
Approved humanities or social sciences	9
Personal Health (H 160)	2
Officer education or other electives	10

Junior Year

Genetics (Bi 341)	3
General Physics (Ph 201,202,203)	12
[2] Quantitative Analysis (Ch 234)	4
Approved courses in communication skills	3
Approved electives	26

Senior Year

Students may choose to enter dental school after their junior year. Those who do not should plan their senior year in consultation with a predental adviser. Stress should be placed on acquiring proficiency in a major field of interest within the sciences. The following is a list of suggested upper division science courses from which to select hours to complete the school requirement for 24 upper division hours in science: Histology (Z 461), Cell Physiology (Bi 360,361), Animal Physiology (Z 431,433 or Z 431,435), Microbial Physiology (Mh 550), General Ecology (Bi 370), Developmental Biology (Z 425), Radiation Biology (GS 451,542,543), Introduction to Statistics (St 311,312), X-Ray Technology (GS 461,462,463), Biophysics (BB 331, 332,333), Physical Chemistry (Ch 423,424, 425), Comparative Vertebrate Embryology (Z 421).

[1] Students intending to apply to the U of O Dental School should take Elementary Biochemistry (BB 350) in place of Ch 228.
[2] Not required for admission to the U of O Dental School.

DENTAL HYGIENE

Students wishing to combine the two-year dental hygiene program at the University of Oregon Dental School with one designed to meet requirements for a bachelor's degree may attend OSU the freshman and senior years, or for two years following completion of dental school training. The first option is recommended and forms the basis for the following curriculum.

Counselor for predental hygiene students is Dr. A. W. Pritchard, Professor of Zoology.

Curriculum

Freshman Year	*Hours*
English Composition (Wr 121)	3
Approved courses in communication skills	6
Biological science sequence (GS 101,102, 103 or Z 201,202,203)	9–12
General Chemistry (Ch 104,105,106)	13
Social science (Soc 204,205,206)	9
Physical education	3
Personal Health (H 160)	2
Electives	1–3

Sophomore and Junior Years (Dental School)

	Hours
Dental hygiene program	102

Senior Year

Upper division science courses	10–15
Approved courses in humanities	9
Electives	22–29

ENTOMOLOGY

Entomology courses help students gain an understanding of the life processes of insects, their role in the ecosystem, the diversity of insect life, and means of population regulation and recognition characters of the main groups.

The undergraduate degree program provides preparation for certain types of commercial and regulatory work and for advanced study. Graduate study is essential for research work and college and university teaching.

In conjunction with the Department of Botany, an undergraduate option in pest management for plant protection is now available.

Undergraduates may either major in entomology or take the option in pest management for plant protection.

The Entomology Department has close ties with the agricultural experiment station, which has many research facilities available for students and staff—such as the entomology farm, compartmented greenhouses, an aquatic insect laboratory, and forest insect research laboratory. In addition to the OSU faculty, state and federal entomologists stationed in this vicinity may be consulted in their fields of specialization. The entomology museum has more than 780,000 specimens of insects and mites.

For requirements for the M.A., M.S., and Ph.D. degrees and opportunities for research and teaching assistantships, see GRADUATE SCHOOL.

The graduate majors are entomology, applied entomology, forest entomology, systematic entomology, acarology, aquatic entomology, veterinary entomology, insect physiology, insect toxicology, plant virus transmission, insect ecology, pest management, insect pathology, and biological control.

Curricula

ENTOMOLOGY

Freshman Year	*Hours*
General Chemistry (Ch 204,205,206)	15
Mathematics (Mth 110,111,112)	12
English Composition (Wr 121)	3
Approved courses in humanities or social sciences	9
Personal Health (H 160) and physical education	5
Electives	4

Sophomore Year	
Organic Chemistry (Ch 226,227,229)	8
Elementary Biochemistry (BB 350)	4
Biology (Bi 211,212,213)	15
Approved course in communication skills	3
Approved courses in humanities or social sciences	9
General Entomology (Ent 314)	4
Electives	5

Junior Year	
Approved course in communication skills	3
Cell Physiology (Bi 360)	3
General Ecology (Bi 370) and Ecological Methods (Bi 371)	5
Physics (Ph 201,202,203)	12
Statistical Methods (St 451,452)	8
Systematic Entomology (Ent 452,453)	8
Electives	9

Senior Year	
Genetics (Bi 341)	4
Principles of Insecticide Usage (Ent 441)	3
Crop Protection Entomology (Ent 442)	3
Insect Ecology and Biological Control (Ent 485)	5
Invertebrate Zoology (Z 451 or 452)	5
Plant Physiology (Bot 331)	5
Developmental Biology (Bi 425)	5
Anatomy and Physiology of Insects (Ent 416)	4
Electives	14

PEST MANAGEMENT FOR PLANT PROTECTION

Freshman Year	*Hours*
General Chemistry (dependent on placement scores)	11–15
Mathematics (dependent on placement scores)	8–12
English Composition (Wr 121)	3
Approved courses in humanities	6
Physical education	3
Prin Wildlife Conservation (Wld 251)	3
Officer education or other electives	6–14

Sophomore Year	
Organic Chemistry (Ch 226,227,229)	8
Biology (Bi 211,212,213)	15
Approved course in communication skills	3
Personal Health (H 160)	2
Approved courses in humanities or social sciences	6
General Horticulture (Hort 215) or Crop Production (ACS 211)	3–5
Entomology (Ent 311 or 314)	4
Electives	5–7

Junior Year	
Approved courses in humanities or social sciences	6
General Ecology (Bi 370)	3
Genetics (Bi 341)	4
Soils (Sls 210)	5
Systematic Entomology (Ent 452)	4
Plant Breeding (ACS 415)	4
Approved course in communication skills	3
Economics (AEc 111 or 211)	3–5
Weed Control (ACS 418)	5
Electives	9–11

Senior Year	
Plant Pathology (Bot 450)	5
Anatomy and Physiology of Insects (Ent 416)	4
Principles of Insecticide Usage (Ent 441)	3
Plant Protection Entomology (Ent 442)	3
Insect Ecology and Biological Control (Ent 485)	5
Field Plot Technique (ACS 516)	5
Extension Methods (EM 411)	3
Electives	20

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (G) may be taken for graduate credit.

Ent 311 Applied Entomology
4 hours fall 2 ① 2 ②
Recognition, biology, and management of injurious and beneficial insects; insects and human welfare. BERRY.

Ent 314 General Entomology
4 hours winter and spring 2 ① 2 ②
Study of insects with emphasis on biology, ecology, classification, morphology, physiology, and control. RITCHER.

Ent 401 Research
Terms and hours to be arranged
Work on approved problems carried on in library, laboratory, or field.

Ent 403 Thesis

Ent 405 Reading and Conference

Ent 407 Seminar
Terms and hours to be arranged

Ent 416
Anatomy and Physiology of Insects (G)
4 hours fall 2 ① 2 ②
Structure and function of the appendages and principal organ systems; nerve transmission, locomotion, digestion, excretion, respiration, and reproduction. Prerequisite: Ent 311 or 314. BROOKES.

Ent 423 Forest Entomology (G)
3 hours fall 2 ① 1 ③
Bark beetles, sawflies, Lepidoptera, and Homoptera injurious to forest trees. Prerequisite: one year of forestry or biological science. RUDINSKY.

Ent 425 Forest Insect Dynamics (G)
3 hours winter 2 ① 1 ③
Insect-host interaction, especially pheromones, and host's susceptibility to resistance. Prerequisite: Ent 423 or equivalent. Offered alternate years. Offered 1974-75. RUDINSKY.

Ent 433 Aquatic Entomology (G)
4 hours spring 2 ① 2 ②
Biology, ecology, collection, and identification of aquatic insects. Prerequisite: upper division standing. ANDERSON.

Ent 441 Principles of Insecticide Usage
(G) 3 hours fall 3 ①
Pesticides: their chemistry, formulation, environmental and legal aspects, and toxicology. Prerequisite: organic chemistry. TERRIERE.

Ent 442 Plant Protection Entomology
(G) 3 hours winter 2 ① 1 ②
The chemical, cultural, and biological control of insect pests of crops. Prerequisite: Ent 311 or 314. SWENSON.

Ent 443
Medical and Veterinary Entomology
(G) 3 hours spring 3 ①
Control of arthropod pests of man, his animals, goods, and structures. Prerequisite: Ent 311 or Ent 314. GOULDING.

Ent 450
Systematics and Adaptations of Insects
(G) 4 hours spring 2 ① 2 ②
Evolution of the insects and near relatives; emphasis on critical points of biological, ecological, and morphological divergence. Prerequisite: Ent 314. LATTIN.

Ent 452,453 Systematic Entomology
(G) 4 hours fall and winter 2 ① 2 ②
Taxonomy, nomenclature, literature, phylogeny, and distribution of insects. Prerequisite: Ent 311 or Ent 314. LATTIN.

Z 454 Principles of Symbiosis (G)
4 hours spring 2 ① 2 ②
See ZOOLOGY.

Ent 461 General Acarology (G)
4 hours spring 2 ① 2 ②
Taxonomy of mites and ticks, collection and preservation. Consent of instructor required. Prerequisite: Ent 314. Offered alternate years. Not offered 1974-75. KRANTZ.

Ent 475 Comparative Animal Behavior
(G) 3 hours spring 3 ①
Concepts of behavior; sensory receptors, internal mechanisms, governing responses; learning and habituation; social organization and communication. Prerequisite: one year of biological science. STEPHEN.

Ent 485
Insect Ecology and Biological Control
(G) 5 hours winter 3 ① 2 ②
Influence of environment on insect development and distribution, characteristics of insect populations, relation of insect enemies to insect populations, case-history examples of population regulation studies. Prerequisite: Ent 314; Bi 370. NAGEL, ANDERSON.

Graduate Courses

See also courses marked (*g*) and (G) above.

Ent 501 Research

Ent 503 Thesis

Ent 505 Reading and Conference
Terms and hours to be arranged

Ent 507 Seminar
Terms and hours to be arranged

Ent 515
Methods of Insect Population Analysis
3 hours winter 1 ① 2 ③
Applied biometry, sampling techniques, life table and component analyses. Prerequisite: Bi 370; St 451,452. Offered alternate years. Not offered 1974-75. NAGEL.

Ent 516,517,518
Selected Topics in Entomology
3 hours each term
Topics: (1) economic entomology, (2) forest entomology, (3) insect toxicology, (4) insect physiology, (5) systematic entomology, (6) aquatic entomology, (7) medical and veterinary entomology, (8) biological control, (9) advances in pest management.

Ent 525
Insect Transmission of Plant Viruses
3 hours spring 2 ① 1 ③
Plant virus transmission by arthropods applied to field and laboratory. Prerequisite: Ent 452; Bot 551. Offered alternate years. Not offered 1974-75. SWENSON.

Ent 554 Immature Insects
3 hours fall 3 ②
Collection, preservation, and identification; taxonomy and morphology. Prerequisite: Ent 453, 416. Offered alternate years. Offered 1974-75. RITCHER.

Ent 572
Developmental Physiology of Insects
4 hours winter 2 ① 2 ②
Growth and development, nutrition, metabolism; endocrine system and metamorphosis. Prerequisite: Ent 416. BROOKES.

Ent 582 Principles of Systematics
3 hours spring 3 ①
History, principles, trends in International Code as applied to zoological sciences; species; infraspecific and superspecific categories; type method. Prerequisite: systematic entomology, zoology, or botany; genetics. Students who have not had genetics must have consent of instructor. Offered alternate years. Offered 1974-75. LATTIN.

Ent 583 Speciation and Distribution
3 hours fall 3 ①
Distributional patterns exhibited by insects, other animals, and plants from early geological time to present and significance in evolution; genetic and systematic views on formation of specific and infraspecific categories. Prerequisite: Systematic entomology, zoology, or botany; genetics. Students who have not had genetics must have consent of instructor. Offered alternate years. Not offered 1974-75. STEPHEN.

GENERAL SCIENCE

The Department of General Science offers *undergraduate* curricula which allow considerable flexibility and emphasize the interdisciplinary approach to science. A basic core of introductory science sequences is taken during the first two years, followed by a selection of major options in biological science, physical science, or earth science during the last two years. Most of the science coursework is selected from the offerings of other departments. A more detailed bulletin describing the undergraduate curricula is available from the department office in Weniger Hall 355.

Although the curricula in general science are not intended to prepare students for graduate majors in science departments which offer complete undergraduate programs, they are appropriate as preparation for graduate work in interdisciplinary fields which do not offer undergraduate majors, such as oceanography, and for students interested in fields that involve two or more of the traditional physical and/or biological sciences, such as radiation biology or radiological physics.

Graduate programs are of two types: (1) Interdisciplinary programs in biological or physical science in which coursework is selected mainly from the offerings of other departments, but research projects are supervised by faculty in general science. These programs provide preparation for teaching at the college level or professional research in interdisciplinary areas, such as environmental science. (2) Specific professional areas in which the coursework is taught by faculty in this department. These include the history of science and the radiation sciences (radiation biology, radiological health, radiological physics). Programs in the radiation sciences are offered in conjunction with the X-Ray Science Laboratory and the Radiation Center. Brochures describing these programs may be secured from the departmental office.

The undergraduate major is in general science with options in biological science, physical science, or earth science.

Graduate majors are biological science, physical science, earth science, radiation biology, radiological physics, radiological health, and history of science.

Curriculum

Freshman Year	*Hours*
General Chemistry	9–15
Approved mathematics	12
Approved humanities or social science	9
English Composition (Wr 121)	3
Physical education	3
[1]Electives	6–12

Sophomore Year	
[3]General biology	12–15
[2]General physics	12–15
Approved humanities or social science	9
Approved course in communication skills	3
Personal Health (H 160)	2
[1]Electives	4–10

Junior Year	
Approved upper division courses in major option	12
Approved humanities or social science	9
Approved course in communication skills	3
[1]Electives	24

Senior Year	
Approved upper division courses in major option	12
History and/or Philosophy of Science	9
Senior Seminar (GS 407)	1
[1]Electives	26

[1] Additional lower division science courses are required in some major options.

[2] Students in the biological science major option should take organic chemistry here and postpone general physics to the junior year.

[3] Students in the earth science major option should take general geology in the sophomore year and postpone general biology until the junior year.

Lower Divison Courses

[1]GS 101,102,103 General Biology
4 hours each term 3 ① 1 ②
GS 101: Ecology and population biology. *GS 102:* Genetics evolution and behavior. *GS 103:* Cellular structure and function, physiology, reproduction, and development. For majors in fields other than the biological sciences.

[2]GS 104,105,106 Physical Science
4 hours each term 3 ① 1 ②
Concepts and principles integrated from physics, chemistry, and the earth sciences; emphasizes an understanding of the nature of science as a human endeavor; utilizes inquiry-type laboratory activities. For non-science majors.

Upper Division Courses
Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

GS 311,312 Science and Society
3 hours 3 ①
A sociological history of science from 1600 to the present. The development of science in relation to other social institutions and the intellectual context of that development. Prerequisite: one year of college science.

GS 331 Bioecology
3 hours 2 ① 1 ③
Plants and animals in their life processes and their reaction upon the environment, human relations and bioeconomics. Many field trips required. Prerequisite: one year of biological science and junior standing.

GS 332 Biogeography
3 hours 3 ①
Plant and animal distribution, faunas and floras, biogeographic areas. Prerequisite: one year of biological science.

GS 371,372,373
Modern Concepts in Physical Science
3 hours each term 3 ①
A synthesis of modern ideas concerning man's physical environment. Prerequisite: two years of approved physical science.

GS 401 Research

GS 403 Thesis

GS 405 Reading and Conference

GS 407 Seminar
Terms and hours to be arranged

GS 411,412,413 History of Science (G)
3 hours each term 3 ①
GS 411: Scientific thought from ancient civilizations to the post-Roman era. *GS 412:* Origins of modern science in the sixteenth and seventeenth centuries. *GS 413:* Development of modern science in the eighteenth and nineteenth centuries. May be taken in any order. Prerequisite: senior standing; at least one science sequence. Concurrent enrollment in GS 421,422, 423 encouraged.

GS 414,415 History of Biology (G)
3 hours 3 ①
Key ideas concerning the living world. *GS 414:* Problems in pre-Darwinian biology and relationship of biology to the physical sciences. *GS 415:* Theory of evolution and the foundations of modern biology. Prerequisite: senior standing; one year of biological science.

[1] Credit toward graduation is granted for only one of the following combinations: Z 201,202, 203; or Bi 211,212,213; or GS 101,102,103.

[2] Credit in physical science courses will be accepted toward graduation in combination with university credit in physics, chemistry, or geology only if the physical science is taken first or by special approval of the dean of the School of Science.

GS 421,422,423 Classics of Science
(G) 2 hours each term 2 ①
Each student examines in depth at least one influential scientific work and presents his findings for class discussion. Topics may be either analysis of written works or reconstruction of classic experiments. GS 421,422,423 chronologically parallels GS 411,412,413. Prerequisite: senior standing; one year of laboratory science.

GS 441 Radioecology (G)
3 hours winter 3 ①
Radionuclides in the environment: their measurement and identification, uptake and transfer through food chains. Effect of radiation on natural populations of plants and animals. Prerequisite: GS 451 or Ch 419.

GS 450 Biology and Radiation (g)
2 hours 2 ①
Biological phenomena directly associated with the major divisions of the electro-magnetic radiation spectrum and responses derived from radiation interactions with living matter. Prerequisite: one year of biological science and one year of either physics or chemistry. Not for majors in radiation biology.

GS 451
Introductory Radiation Biophysics
(G) 4 hours fall 3 ① 1 ③
Physics of radiation for biologists. Prerequisite: one year each of general physics, biology, and calculus.

GS 460 Radiation Health (G)
3 hours fall 3 ①
Practical aspects of health physics: radiation monitoring and protection, decontamination, radioactive waste disposal, and licensing regulations. Prerequisite: GS 451 or Ch 419 or equivalent.

GS 461 Machine Sources of X-Rays
(G) 3 hours fall 2 ① 1 ③
X-ray machines and systems used in medical, industrial, and research applications. Prerequisite: one year each of college physics and college mathematics.

GS 462 X-Ray Measurements (G)
3 hours winter 2 ① 1 ③
Instrumentation and procedures used in measurement of X-rays from medical, industrial, and research machines and systems. Prerequisite: GS 461.

GS 463 X-Ray Applications (G)
3 hours spring 2 ① 1 ③
Use of X-rays in medicine, industry, and research. Prerequisite: GS 462.

Graduate Courses
See also courses marked (g) and (G) above.

GS 501 Research

GS 503 Thesis

GS 505 Reading and Conference

GS 507 Seminar
Terms and hours to be arranged

GS 521,522,523
Topics in the History of Science
3 hours each term 3 ①
Advanced treatment of nineteenth-century physical thought, nineteenth-century biological thought, the Newtonian revolution, etc. Topics determined by demand; not all topics given any one year. Prerequisite: GS 423 or 411, 412, and 413.

GS 542 Cellular Radiation Biology
2 hours winter 2 ①
Biochemical and physical properties of cells as they are influenced by interaction with ionizing radiation. Discussion of alteration of macromolecular systems, genetic material, permeability of cell membranes, and cellular replication processes. Prerequisite: GS 451 or modern physics. Background needed in genetics and physiology.

GS 543 Vertebrate Radiation Biology
2 hours spring 2 ①
Etiology of radiation pathogenesis, morphological and physiological aspects of radiation injury in vertebrates. Emphasis on induction of alterations in immune, bloodforming, gastrointestinal, and metabolic systems. Prerequisite: two years of biological science (especially zoology): GS 451.

GS 544
Cellular Radiation Biology Laboratory
2 hours winter 2 ③
Experimental problems demonstrating principles underlying cellular radiation biology phenomena. To be taken concurrently with GS 542.

GS 545
Vertebrate Radiation Biology Laboratory
2 hours spring 2 ③
Experimental problems demonstrating principles underlying vertebrate radiation biology phenomena. To be taken concurrently with GS 543.

GS 551,552,553
Selected Topics in Radiation Biology
3 hours each term 3 ①
Advanced theoretical discussion in the special fields of radiation genetics, physiology, immunology, photobiology, etc. Topics, determined by demand and staff available. Prerequisite: GS 543 or equivalent.

GS 560 Radiation Dosimetry
3 hours 3 ①
Radiation detection, interaction of radiation with matter and energy absorption processes. Prerequisite: GS 561.

GS 561 Radiological Physics
3 hours 2 ① 1 ③
Physical principles underlying the concept of radiation dosimetry. Laboratory designed to develop proficiency in calibration and operation of radiation sources and measuring devices used in radiobiological and biophysical research. Prerequisite: GS 463; GS 451; two years of college physics; one year of college mathematics.

GEOGRAPHY

The Department of Geography is a joint department of the College of Science and the College of Liberal Arts. The major programs, undergraduate and graduate, are administered through the College of Science.

The undergraduate major is designed to provide a liberal education and preparation for either employment or graduate study. The core stresses the organizing concepts of geography, tools and methods of research, and substantive background in physical, resource, and economic geography.

Graduate specializations are in the fields of resource geography and physical geography.

Curricula

Freshman Year	Hours
English Composition (Wr 121)	3
Approved courses in physical or biological sciences	9–12
Approved courses in humanities or social science	9
Approved course in mathematics	4
Introduction to Physical Geography (Ggs 227)	5
Physical education	3
Officer education or other electives	12–15

Sophomore Year	
Approved courses in communication skills	3
Approved courses in humanities or social science	9
Maps and Map Interpretation (Ggs 261)	3
Approved courses in biological or physical sciences	9–12
Cultural Geography (Geog 321,322)	6
Personal Health (H 160)	2
Officer education or other electives	13–16

Junior Year	
Approved courses in communication skills	3
Physical Geography (Ggs 327,328,329)	12
Cartography (Ggs 360)	4
Techniques of Field Research (Ggs 361)	5
Statistics	8
Electives	18

Senior Year	
Geographic Photointerpretation (Ggs 413)	3
Resource Geography	12
Economic Geography	12
Approved upper division sequence other than geography	9
Electives	12

Lower Division Courses

Ggs 199 Special Studies
Terms and hours to be arranged

Ggs 227
Introduction to Physical Geography
5 hours 4 ① 1 ②
An integrated study of the major subsystems of the natural environment, their nature, expression, and spatial distribution.

Ggs 261 Maps and Map Interpretation
3 hours 2 ① 1 ②
Evolution of maps and mapping; map projections, types, uses, sources; graph and diagram types and uses; case and handling.

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Ggs 327,328,329 Physical Geography
4 hours each term 3 ① 1 ②
Systematic analysis of the characteristics, classifications, distributions, and spatial relations of the earth's physical-biotic subsystems. *327:* landforms; *328:* climate; *329:* vegetation. Prerequisite: Ggs 227.

Ggs 360 Cartography
4 hours 1 ① 3 ②
Researching, compiling, designing, and drafting maps, charts, and diagrams. Prerequisite: Mth 102; Ggs 261.

Ggs 361 Techniques of Field Research
5 hours spring 1 ② 2 ③
Recording, classifying, and analyzing field gathered data.

Ggs 401 Research

Ggs 403 Thesis

Ggs 405 Reading and Conference

Ggs 407 Seminar
Terms and hours to be arranged

Ggs 411 Conservation
3 hours 3 ①
Examination and appraisal, resources development, policies of public agencies and private enterprise. Prerequisite: upper division standing.

Ggs 413 Geographic Photointerpretation
(G) 3 hours 1 ① 2 ②
Identification, analysis, and interpretation of landscape elements from aerial photographs; use in geographic analysis and planning. Prerequisite: 18 hours of geography including one year of physical geography.

Ggs 421 Biotic Resource Geography
(g) 3 hours 3 ①
Geographic approach to the realities, prospects, and problems of world resources of forests and fisheries. Prerequisite: Ggs 329.

Ggs 422 Agricultural Geography (g)
3 hours 3 ①
Concepts and methods of agricultural geography, analysis of major world systems. Prerequisite: Ggs 329.

Ggs 423 Minerals Geography (g)
3 hours 3 ①
Principals and problems of world mineral and energy distributions, production, and interactions. Prerequisite: Ggs 329.

Ggs 424 Water Resource Geography
(g) 3 hours 3 ①
Geographic analysis of the spatial relations among bio-physical factors, human factors, and water resource developments. Comparison of water use systems in developed and developing countries and in planned and unplanned economics. The spatial consequences of various water uses. Prerequisite: Ggs 329.

Ggs 461 Map Design (G)
4 hours 2 ① 2 ②
The theory of map design, quantification of map symbols, representation of complex data, problems of reproduction. Prerequisite: 5 hours of cartography; Mth 113; and 18 hours of upper division geography or equivalent.

Graduate Courses
See also courses marked (G) above

Ggs 501 Research

Ggs 503 Thesis

GgS 505 Reading and Conference

Ggs 507 Seminar

Ggs 508 Workshop
Terms and hours to be arranged

Ggs 511
Conservation in the United States
3 hours 3 ①
Principles and needs. Prerequisite: graduate standing.

Ggs 513 Mexico
3 hours 3 ①
Resource geography of Mexico.

Ggs 515 The Science of Geography
3 hours 1 ③
Geography as a modern discipline and fundamental research science; conceptual structure, traditions, and trends. Prerequisite: graduate standing and 18 hours of upper division geography.

Ggs 520 Geography of Outdoor Recreation Resources
3 hours 3 ①
The determinants of recreation environments, recreation resources development, agencies and organizations concerned. Two weekend field problems. Prerequisite: Ggs 329.

Ggs 521 Biotic Resource Geography of the United States
3 hours 3 ①
Geographic analysis of forest and fishery resources with emphasis on research problems and frontiers. Prerequisite: Ggs 421.

Ggs 522 Agricultural Geography of the United States
3 hours 3 ①
Applications of principles and methods of ecological-resource geography to study of U.S. Agriculture; disaggregate analysis of variables, aggregate analysis of spatial systems, research problems. Prerequisite: Ggs 422.

Ggs 523
Mineral Geography of the United States
3 hours 3 ①
Geographic analysis of mineral and energy resources, industries, and commodities; institutional processes and external relationships in mineral development. Prerequisite: Ggs 423.

Ggs 524 Water Resources Geography of the United States
3 hours 3 ①
Geographic analysis of water resources and water developments; institutional processes; multiple, conflicting, and complimentary uses; research problems. Prerequisite: Ggs 424.

Ggs 529 Topics in Resource Geography
3 hours 2 ① 1 ②
Fundamental problems with stress upon methods of analysis. Topics vary; number may be repeated with consent of major professor. Prerequisite: Ggs 561,562 and appropriate topical background.

Ggs 531 Climatology
3 hours 2 ① 1 ②
Climatology in geography; data sources, hierarchies of climatic subsystems, employment in typology with special reference to North America. Prerequisite: Ggs 328.

Ggs 532 Landforms Geography
3 hours 2 ① 1 ②
Contemporary trends; the growth of landforms geography, modern research and theories, sources of data, and analytical methods. Includes one-day field trips. Prerequisite: Ggs 327.

Ggs 533 Ecological Biogeography
3 hours 2 ① 1 ②
The ecosystem as an analytical and unifying concept in biogeography, classification and analysis of natural communities in biogeography. Prerequisite: Ggs 329.

Ggs 534
Climatic Classification and Expression
3 hours 3 ①
Development of climatic classifications, problems of representative expression, man-oriented systems, applications of principles. Prerequisite: Ggs 531.

Ggs 539 Topics in Physical Geography
3 hours 2 ① 1 ②
Fundamental problems with stress upon methods of analysis. Topics vary; number may be repeated with consent of major professor. Prerequisite: Ggs 561,562, and appropriate topical background.

Ggs 561
Quantitative Research Techniques
3 hours 1 ① 2 ②
Quantitative applications in Geography, with emphasis on analysis of variance, regression, correlation, and spatial simulation. Prerequisite: St 451, 452.

Ggs 562 Field Research Techniques
3 hours 1 ① 2 ②
Sampling, questionnaire development, and data gathering, with emphasis on quantitative analysis of collected information. Prerequisite: Ggs 561.

GEOLOGY

The Department of Geology offers undergraduate majors in geology or in paleontology for students interested in geology either for a liberal arts degree or as a professional major. The general geology major permits the student to take a wide variety of electives in other fields.

Graduate majors include areal geology, economic geology, geochemistry, igneous petrology, invertebrate paleontology, metamorphic petrology, micropaleontology, palynology, sedimentary petrology, stratigraphy, structural geology. A field course of at least 9 hours is prerequisite to candidacy for an advanced degree.

Curriculum

Freshman Year	*Hours*
Principles of Geology (G 211,212,213)	12
General Chemistry (Ch 201,202,203)	9
Mathematics (Mth 110,111,112)	12
English Composition (Wr 121)	3
Approved courses in humanities and social sciences	6
Physical education	3
Electives	3

Sophomore Year	
Mineralogy and Rock Study (G 312,313, 314)	12
General Physics (Ph 201,202,203)	12
Approved courses in communication skills	3
Approved courses in humanities and social sciences	6
Personal Health (H 160)	2
Electives	13

Junior Year	
Structural Geology (G 321)	4
Principles of Invertebrate Paleontology (G 343)	4
Approved upper division geology	4
Approved courses in communication skills	3
Approved courses in humanities and social sciences	6
Electives	27

Senior Year	
Principles of Stratigraphy (G 430)	4
Introductory Geochemistry (G 481)	3
Tectonic Principles (G 461)	4
Biological science	9–12
Electives	25–28

An approved field course of at least 9 term hours is required for graduate training.

Lower Division Courses

[1]G 200 Physical Geology
3 hours 3 ①
Elective short course on earth materials, processes, and history. G 204 may be taken concurrently.

[1]G 201,202,203 Geology
3 hours each term 3 ①
Earth materials, processes, and structures; history of earth and life. Must be taken in sequence.

G 204,205,206 Geology Laboratory
1 hour each term 1 ②
Laboratory and field work to accompany G 201, 202,203. Previous or concurrent registration in appropriate lecture course required.

G 211,212,213 Principles of Geology
4 hours each term 3 ① 1 ②
Professional introductory course in physical and historical geology to meet the requirements of majors in earth science. Corequisite: first year of general chemistry.

G 221 Basic Geology
3 hours spring 2 ① 1 ③
Physical geology including laboratory study of minerals, rocks, and topographic maps.

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

G 312,313,314
Mineralogy and Rock Study
4 hours each term 2 ① 2 ②
Crystal forms, physical and chemical properties; economic and rock-forming minerals and common rocks. Prerequisite: one year of chemistry.

[1] Credit may not be obtained for both G 200, G 201, and G 221.

G 321 Structural Geology
4 hours fall 3 ① 1 ③
Origin, interpretation, and mapping of joints, faults, cleavage, plutons, and folds. Prerequisite: Mth 102 and either G 202,205 or 212.

G 322 Geomorphology
4 hours 3 ① 1 ③
Surface features of the earth developed by erosion, deposition, earth movements, and volcanism. Prerequisite: general geology.

G 323 Photogeology
4 hours spring 2 ① 2 ③
Topographic maps, areal geologic maps, air photographs. Prerequisite: G 313,321.

G 331
Geologic History of the Vertebrates
3 hours 3 ①
Evolution of backboned animals based on the fossil record. Designed for the general student rather than the specialist.

G 343
Principles of Invertebrate Paleontology
4 hours winter 2 ① 2 ③
A conceptual approach: study of fossils as single specimens, as species, and as members of higher categories into which species are grouped; application of fossil study to problems of biology and geology.

G 352 Geology of Oregon
3 hours spring 3 ①
Origin and history of landscape features; for students without prior geologic background. Field trips required. Prerequisite: G 200 or equivalent.

G 401 Research

G 403 Thesis

G 405 Reading and Conference
Terms and hours to be arranged

G 407 Seminar
1 hour any term 1 ①

G 412,413,414 Petrography (G)
4 hours each term 2 ① 2 ③
Microscope used in identification of minerals and in rock classification. Prerequisite: G 312, 313,314.

G 415,416,417 X-ray Mineralogy (G)
3 hours each term 2 ① 1 ③
Methods and theory of x-ray diffraction and spectroscopy in identification, structure, and composition of minerals. Prerequisite: G 314; Ch 203.

G 421 Economic Geology
4 hours fall 3 ① 1 ②
Origin, occurrence, exploration, mining, technology, and uses of metals, nonmetallic minerals, and other geologic resources. Prerequisite: G 312,313,314. Some field trips required.

G 424 Biostratigraphy (G)
4 hours winter 2 ① 2 ③
Use of fossils in chronology and correlations; paleo-ecology; stratigraphic succession of invertebrates; collection, preparation, and identification of megafossils. Field trips required. Prerequisite: G 445.

G 430,431 Principles of Stratigraphy (G) 4 hours fall and winter 3 ① 1 ③
Stratigraphic column; environmental, biologic, tectonic factors; correlation; field, laboratory procedures. Field trips required. Prerequisite: two years of geology including G 314,321,343.

G 432 Regional Depo-tectonics (G)
4 hours 3 ① 1 ③
Evolution of major sedimentary belts of the geosynclines, shelves, and cratonic areas. Timing and coordination of orogenic, epeirogenic, and eustatic events. Field trips required. Prerequisite: G 431. Offered alternate years. Offered 1974-75.

G 440 Hydrogeology (G)
3 hours winter 3 ①
Geological factors controlling occurrence and distribution of ground water, methods of exploration and development. Prerequisite: G 312. Offered alternate years.

G 443,444,445
Invertebrate Paleontology (g)
4 hours each term 2 ① 2 ③
Major phyla of fossil invertebrates, with emphasis on comparative morphology of fossil and living representatives, important Paleozoic and Mesozoic guide fossils. Prerequisite: two years of general geology or two years of biological science.

G 461 Tectonic Principles (G)
4 hours winter 3 ① 1 ③
Application of methods of structural geology to the interpretation of tectonic problems and processes, including elementary structural analysis and mechanical principles. Prerequisite: G 321; Mth 112.

G 480 Field Geology
12 hours
Small area studied intensively in eight-week summer camp. Prerequisite: G 314,323.

G 481 Introductory Geochemistry (G)
3 hours spring 3 ①
Principles of geochemistry applied to problems of earth history. Prerequisite: G 314; Ch 203; Mth 112.

Graduate Courses
See also courses marked (g) and (G) above.

G 501 Research

G 503 Thesis

G 505 Reading and Conference

G 507 Seminar
Terms and hours to be arranged

G 512,513,514 Petrology
Hours to be arranged
Petrogenesis of igneous and metamorphic rocks. Prerequisite: G 414. Offered alternate years. Not offered 1974-75.

G 520,521,522 Economic Geology
3 hours each term 2 ① 1 ③
Origin and occurrence of metallic and nonmetallic ore deposits including fossil fuels. Field trips required. Prerequisite: G 312,313,314,414. Offered alternate years. Offered 1974-75.

G 523,524,525 Sedimentary Petrology
4 hours each term 2 ① 2 ③
Laboratory analysis of sedimentary rocks. Corequisite: G 412,413,414. Offered alternate years. Offered 1974-75.

G 526,527 Sedimentation
3 hours each term 3 ①
Interdependence between tectonism and sedimentation, depositional environment and composition, textures and structures of geosynclinal and nongeosynclinal sediments. Prerequisite: G 525. Offered alternate years. Not offered 1974-75.

G 540,541 Micropaleontology
4 hours each 2 ① 2 ③
Collection, preparation, classification, and identification of microfossils; biostratigraphy and ecologic evaluation of fossil foraminiferal assemblages. Prerequisite: three years of geology or zoology; G 443.

G 543,544,545 Palynology
4 hours each term 2 ① 2 ③
Principles, morphology of pollen and spores, field and lab techniques, interpretation of pollen diagrams, paleoecology, paleoclimate, geochronology.

G 554 Volcanology
4 hours spring 3 ① 1 ②
Volcanic activity, form and structure of volcanoes, petrogenesis of volcanic rocks. Prerequisite: G 414.

G 560,561,562 Fundamental Problems
3 hours each term 3 ①
Interior of the earth, basin deposition and case histories, igneous and metamorphic processes in continental evolution. Offered alternate years. Offered 1974-75.

G 571,572,573 Tectonics
3 hours each term 3 ①
Theoretical structural geology, geotectonics and regional structure of selected areas. Prerequisite: G 321.

G 580 Graduate Field Geology
Terms and hours to be arranged
Advanced field problems assigned to meet the requirements of the graduate student.

G 581,582,583 Geochemistry
3 hours each term 3 ①
Study of the distribution and partitioning of the chemical elements in igneous, sedimentary, and metamorphic rocks in the earth's crust. Prerequisite: Ch 425; G 314. Offered alternate years. Offered 1974-75.

MATHEMATICS

Mathematics is "the science which draws necessary conclusions" (Benjamin Peirce, 1870). The typical mathematician, whether "pure" or "applied," makes definitions and hypotheses, and then traces out their logical consequences. This "mathematical method" can be applied to any object of thought, including thought itself. Courses offered in the department develop this method in directions which will help students in the various branches of science and technology, as well as along paths which will produce mathematical specialists.

Placement examinations for incoming students are described under PROCEDURES AND REQUIREMENTS elsewhere in this catalog. Flexibility is allowed for first-term shifting of level up or down, and Mth 50, 51,60 are offered as subfreshman remedial courses. Those who are studying the calculus in high school should investigate the Advanced Placement Program under which college credit may be given.

Undergraduate majors. Informal options include: pure, applied, or actuarial mathematics; secondary teaching. Suggested course programs for these options, details about honors programs, and other information are included in a special departmental publication, obtainable on request.

Concurrent degrees (see DEGREES AND CERTIFICATES). On petition, the biological science requirement may be reduced to 5 hours for students taking baccalaureate degrees in both mathematics and engineering, *provided* a year of biology was taken in high school.

Graduate Study

Languages. Anyone who contemplates graduate work in mathematics should learn to read at least two of the languages French, German, Italian, and Russian. This should be done early—by the junior year if possible.

Detailed information about the graduate program is contained in a departmental publication, obtainable on request. In general there are two options in the *master's program:*

The Standard Option, which provides a foundation for possible Ph.D. work, and the Secondary Teachers Option.

A Problems Seminar takes the place of a departmental qualifying examination and should be taken during the first year of graduate work. Alternatives to a thesis are either an expository paper with extra course work or successful completion of the doctoral Preliminary Examination.

The doctoral program is designed to train teachers and independent research workers for universities, government laboratories, and industry. The Ph.D. is a research degree. Special emphasis is placed on (1) analysis and its many ramifications, including the differential and integral equations of mathematical physics, numerical methods and abstract functional analysis; (2) algebra, including number theory; (3) topology and geometry; (4) probability theory and its applications.

Special joint programs have been established: Computer Science (see COMPUTER SCIENCE); Applied Mathematics: Geophysics Option (with the School of Oceanography).

The arrangement of courses below is only advisory: individual students frequently deviate from this schedule.

Curriculum

Undergraduate majors: mathematics with emphasis on any of the fields of the graduate majors; actuarial mathematics, secondary teaching.

Graduate majors: analysis, algebra, topology, applied mathematics, number theory, numerical analysis, probability, geometry.

Freshman Year	*Hours*
Mathematics (Mth 111,112,113)	12
Approved courses in biological sciences	9
English Composition (Wr 121)	3
Physical education	3
Officer education or other elective	21

Sophomore Year	
Mathematics (Mth 211,241,311,312)	16
Approved courses in humanities and social sciences	9
Approved physical science courses	9
Approved courses in communication skills	3
Personal Health (H 160)	2
Officer education and other electives	9

Junior Year	
Upper division mathematics (including Mth 341,342)	18
Approved courses in humanities and social sciences	9
Approved courses in communication skills	3
Electives	18

Senior Year	
Approved senior mathematics sequence	9
Upper division mathematics	1
Electives	38

Recommended as preparation for graduate study: Mth 411,412,413 / 434,435,436 / 440,447,448. Substitutions allowed for students in science education and those receiving concurrent degrees. A GPA of 2.00 or higher required in both senior sequence and all upper division mathematics courses.

Lower Division Courses

Mth 10 Elementary Algebra
No credit 4 ①
Review of beginning high school algebra. Offered only in summer term.

Mth 95 Intermediate Algebra I
4 hours 4 ①
Review of elementary algebra. Exponents, simultaneous linear equations and inequalities, factoring quadratics, fractional expressions, and equations. This course presupposes some high school algebra. Prerequisite: appropriate placement score.

Mth 101 Intermediate Algebra II
4 hours 4 ①
Equations and inequalities, functions and their graphs, exponential and logarithm functions, complex numbers, polynomials, mathematical induction, binomial theorem. Prerequisite: Mth 95 or appropriate placement score.

Mth 102 Trigonometry
4 hours 4 ①
Trigonometric functions for general angles, solution of triangles, addition formulas, trigonometric equations, graphs. Prerequisite: placement or Mth 101.

Mth 107,108 Finite Mathematics
4 hours each term 4 ①
Symbolic logic, sets and Venn diagrams; probability; vectors and matrices; linear inequalities and programing; game theory. Prerequisite: Mth 111 placement or Mth 101.

Mth 110 Calculus Preparation
4 hours 4 ①
Review of algebra, trigonometry, elementary functions; topics in analytic geometry. Strongly recommended for students with minor deficiencies in these areas. Prerequisite: Placement by adviser.

Mth 111,112,113 Calculus
4 hours each term 4 ①
Differentiation and integration of functions of one variable, maxima and minima, applications to physics and other sciences, infinite series, improper integrals. Prerequisite: placement or Mth 110.

Mth 161,162,163
Mathematics for the Biological, Management, and Social Sciences
4 hours each term 3 ① 1 ①
Topics from symbolic logic, probability, algebra, analytic geometry, and elementary calculus; applications in business, biology, and the social sciences. Mth 101 placement or Mth 95.

Mth 190 Freshman Honors
1 hour each term, 3 terms 1 ①
Consent of instructor required.

Mth 191,192,193
Mathematics for Elementary Teachers
3 hours each term 3 ①
Arithmetic as a logical structure. *Mth 193:* the new programs.

Mth 198 Internship: Elementary Teachers
1 hour spring 1 ①
Provides field experience in teaching mathematics for students registered in Mth 193

Mth 211 Calculus of Several Variables
4 hours 4 ①
Linear algebra, partial differentiation, multiple integration. Prerequisite: Mth 113.

Mth 241 Elementary Linear Algebra
4 hours 4 ①
Vectors, linear transformation from R^n to R^n, matrices, linear equations and determinants. Prerequisite: Mth 110 or Mth 161 or Mth 111 placement

Mth 290 Sophomore Honors
1 hour each term, 3 terms 1 ①
Consent of instructor required.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Mth 311,312 Advanced Calculus
4 hours each 4 ①
Foundations of one variable calculus including uniform convergence, uniform continuity, and interchange of limits. An introduction to functions of several variables including topological concepts, inverse and implicit function theorems, and Riemann integration. Prerequisite: for Mth 311, Mth 211; for Mth 312, Mth 241, 311.

Mth 321,322
Applied Differential Equations
4 hours each term 4 ①
Linear systems of ordinary differential equations, numerical methods, vectors, boundary value problems for partial differential equations. Applications to physical and engineering science. Prerequisite: Mth 211.

Mth 332
Fundamental Concepts of Geometry
3 hours 3 ①
Non-rigorous, axiomatic plane and solid Euclidean geometry and projective geometry with models of each in the other; duality. Prerequisite: Mth 241.

Mth 333
Fundamental Concepts of Topology
3 hours 3 ①
Open and closed sets, continuity, compactness, connectedness, winding number, fixed point theorems in the plane. Prerequisite: Mth 241.

Mth 337,338 Geometry
3 hours each term 3 ①
Analytic plane projective, affine and Euclidean geometry with homogeneous and inhomogeneous coordinates. Prerequisite: Mth 113 and Mth 241.

Mth 341,342 Linear Algebra
3 hours each term 3 ①
Matrix algebra, norms, quadratic forms, canonical reductions. Prerequisite: Mth 241.

Mth 345 Combinatorial Mathematics
3 hours winter 3 ①
Permutations and combinations, generating functions, linear recurrence relations, the principle of inclusion and exclusion, graph theory, trees, circuits, and cut sets. Prerequisite: Mth 113 or Mth 241.

Mth 346 Theory of Numbers
3 hours 3 ①
Integers, Euclid's algorithm, diophantine equations, prime numbers, and congruences. Prerequisite: Mth 113 or Mth 241.

Mth 347,348 Algebraic Structures
3 hours each term 3 ①
Topics in groups, rings, fields. Prerequisite: Mth 241.

Mth 358,359
Introduction to Numerical Calculus
3 hours each 3 ①
Solutions of equations in one unknown, curve fitting, interpolation, numerical differentiation and integration, list sorting, table look-up. Prerequisite: Mth 113; CS 213.

Mth 361 Probability
3 hours 3 ①
Combinatorial problems, continuous distributions, expectation, laws of large numbers. Prerequisite: Mth 111 or 162.

Mth 362 Finite Differences
3 hours 3 ①
Difference techniques used in finite integration and series summation, solution of difference equations. Prerequisite: Mth 111.

Mth 363
Linear Programming and Games
3 hours 3 ①
Optimization subject to linear constraints, zero-sum two-person games, industrial and economic problems. Prerequisite or corequisite: Mth 241.

Mth 390 Junior Honors
1 hour each term, 3 terms 1 ①
Enrollment in College of Science Honors Program or consent of instructor required.

Mth 401 Research

Mth 403 Thesis

Mth 405 Reading and Conference

Mth 407 Seminar
Terms and hours to be arranged

Mth 411 Metric Spaces in Analysis (G)
3 hours 3 ①
Topological concepts, theorems of Baire, Stone-Weierstrass, Tietz, Ascoli, Contraction mapping. Further topics such as differential calculus in normed spaces. Prerequisite: Mth 312 and Mth 341.

Mth 412,413 Lebesgue Integration and Its Applications (G)
3 hours each term 3 ①
Lebesgue theory in one and several variables. Lebesgue-Stieltjes integral. Fundamental Theorem of Calculus, applications such as L^p spaces, Fourier series and integral, distribution theory of Schwartz, change of variables in multiple integrals. Prerequisite: for *Mth 412:* Mth 312; for *Mth 413:* Mth 411,412.

Mth 414 Vector Analysis (G)
3 hours 3 ①
Calculus of functions of two or more variables. Prerequisite: Mth 322

Mth 415 Orthogonal Series (G)
3 hours 3 ①
Fourier series and their convergence, expansions in terms of other orthogonal functions. Prerequisite: Mth 312.

Mth 416 Complex Functions (G)
3 hours 3 ①
Analytic functions of a complex variable. Prerequisite: Mth 312.

Mth 421,422,423 The Theory of Ordinary Differential Equations (G)
3 hours each term 3 ①
Ordinary differential equations including existence theorems, systems, and nonlinear oscillation theory. Prerequisite: Mth 312 and Mth 321.

Mth 424,425,426
Partial Differential Equations of Physics
(G) 3 hours each term 3 ①
Second order partial differential equations governing various physical phenomena; orthogonal expansions, Green's functions. Prerequisite: Mth 312 and Mth 321.

Mth 427 Calculus of Variations (G)
3 hours 3 ①
Minimization of integrals involving functions of one or more variables. Prerequisite: Mth 312 and Mth 321.

Mth 428,429 Linear Integral Equations
(G) 3 hours each 3 ①
Conversion of differential problems into linear integral equations of Volterra and Fredholm types, solutions by iteration and other methods, existence theories, eigenvalue problems and the Hilbert-Schmidt theory of symmetric kernels. Prerequisite: Mth 312, Mth 321 and Mth 241.

Mth 434,435,436 Differential Geometry
(G) 3 hours each term 3 ①
Local curve theory; global curve theory; exterior surface theory: fundamental forms, curvatures, geodesics; differentiable 2-manifolds: differential forms, exterior products and derivatives, integration of forms. Prerequisite: Mth 241, Mth 312.

Mth 440 Topics in Number Theory
(G) 3 hours 3 ①
Selected topics in number theory. Prerequisite: Mth 346.

Mth 443 Multilinear Algebra (G)
3 hours 3 ①
Multilinear forms and transformations, algebra of tensors. Prerequisite: Mth 342.

Mth 447,448 Abstract Algebra (G)
3 hours each term 3 ①
Groups, rings and ideals, polynomials and unique factorization rings, modules and vector spaces, fields. Prerequisite: Mth 342 or Mth 348.

Mth 451,452,453 Numerical Calculus
(G) 3 hours fall, winter, spring 3 ①
Mth 451: Matrix problems, theory and programming of numerical techniques. *Mth 452:* Ordinary differential equations: theory and programming of numerical techniques. *Mth 453:* Partial differential equations: theory and programming of numerical techniques. Prerequisite: CS 213; Mth 341 and Mth 359.

Mth 464,465,466 Theory of Probability
(G) 3 hours each term 3 ①
Random variables, central limit theorem; distributions of standard statistics; Markov chains, continuous and discontinuous stochastic processes. Prerequisite: Mth 312 and Mth 241.

Mth 468,469
Mathematical Programming (G)
3 hours each 3 ①
General concepts and algorithms of linear programming and distribution. Integer, quadratic, and dynamic programming. Kuhn-Tucker conditions. Prerequisite: Mth 363 or equivalent, Mth 211.

Mth 471
Mathematical Principles of Mechanics
(G) 3 hours 3 ①
Mathematical foundations of the analytical mechanics of particles and rigid bodies. Prerequisite: Mth 312, or Mth 322 and consent of instructor.

Mth 472,473 Mechanics of Continua
(G) 3 hours each 3 ①
Elements of tensor theory with applications to study of continuous matter: fluids, plastics, elastic solids. Prerequisite: Mth 312, or Mth 322 and consent of instructor.

Mth 481,482,483
Mathematical Methods for Engineers and Physicists (g)
3 hours each term 3 ①
Vibrating systems, boundary value problems in electricity and elasticity, operational calculus, numerical methods and techniques of operations research. Prerequisite: Mth 322.

Mth 487,488,489
Numerical Methods for Scientists (g)
3 hours each term 3 ①
Finite differences; interpolation, numerical integration, linear systems, polynomials, differential equations. Primarily for advanced students in physical or engineering science. Prerequisite: Mth 321 or 6 hours of upper division mathematics.

Mth 491,492,493
Mathematics for Secondary Teachers
(g) 3 hours each term 3 ①
Mth 491: arithmetic. *Mth 492:* algebra. *Mth 493:* geometry. Study in depth of the new curricula, especially those being developed by the School Mathematics Study Group. Prerequisite: 3 hours of upper division mathematics.

Mth 494
Foundations of Elementary Mathematics
(g) 3 hours 3 ①
Logical development of selected portions of arithmetic, algebra, and geometry. Prerequisite: 3 hours of upper division mathematics.

Mth 495
History of Elementary Mathematics (g)
3 hours 3 ①
Arithmetic, algebra, and geometry from ancient times into the modern era. Prerequisite: 3 hours of upper division mathematics.

Mth 496 History of the Calculus (G)
3 hours 3 ①
Areas, volumes, rates from early Greek mathematics to modern times. Prerequisite: 6 hours of upper division mathematics.

Graduate Courses
See also courses marked (g) and (G) above.

Mth 501 Research

Mth 503 Thesis

Mth 505 Reading and Conference

Mth 507 Seminar
Terms and hours to be arranged

Mth 510 Foundations of Analysis
3 hours 3 ①
Axiomatic development of the real number system. Prerequisite: Mth 411.

Mth 511,512,513
Theory of Analytic Functions
3 hours each term 3 ①
Interchange of limits, analytic functions of a complex variable, continuation, conformal mapping, integral functions. Prerequisite: Mth 413 or Mth 414,415,416.

Mth 514
Abstract Measure Theory and Integration
3 hours 3 ①
Measures and outer measures, measurable functions and integration, convergence theorems, Lp, spaces. Example and additional topics, e.g. absolute continuity and Radon-Nikodym's theorem or product measures and Fubini's theorem. Prerequisite: Mth 413.

Mth 515 Normed Linear Spaces and Linear Operators
3 hours winter 3 ①
Linear analysis: Banach and Hilbert spaces, dual spaces, continuous operators, compact operators; applications to analysis. Prerequisite: Mth 413.

Mth 516 Topics in Linear Analysis and Measure Theory
3 hours spring 3 ①
Function spaces and their duals: spaces of measures, operator representations. Further topics, such as spectral theory, ergodic theory and nonlinear operators. Prerequisite: Mth 514, 515.

Mth 521,522,523
Higher Applied Analysis
3 hours each term 3 ①
Applications of complex functions and integral transforms to differential and integral equations of mathematical physics. Prerequisite: Mth 413 or Mth 414,415, and 416.

Mth 527,528,529
Partial Differential Equations
3 hours each term 3 ①
Advanced theory, including existence proofs. Prerequisite: Mth 426 and Mth 513.

Mth 531,532 Topology
3 hours each 3 ①
Elements of general topology. Fundamental groups and covering spaces. Prerequisite: Mth 411.

Mth 533 Simplicial Homology
3 hours 3 ①
Simplicial complexes, chain complexes, and homology; Brouwer and Lefschetz, fixed-point theorems. Prerequisite: Mth 411.

Mth 534,535,536 Algebraic Topology
3 hours each term 3 ①
Simplicial and singular homology, products, and cohomology; applications to fixed-point and separation theorems. Topics selected from homotopy, manifold and obstruction theory. Prerequisite: Mth 533.

Mth 537,538,539
Differential Geometry of Manifolds
3 hours each term 3 ①
Differentiable manifolds, connections in linear bundles, Riemannian manifolds and submanifolds. Selected topics, such as variational theory of geodesics, harmonic forms, and characteristic classes. Prerequisite: Mth 342,411.

Mth 541,542,543 Modern Algebra
3 hours each term 3 ①
Advanced theory of matrices, finite groups, rings, and fields. Galois theory of equations; associative linear algebras, nonassociative algebras, group representations. Prerequisite: Mth 448.

Mth 561,562,563
Applications of Stochastic Processes
3 hours each term 3 ①
Various types of random processes occurring in the physical and biological sciences, engineering and management. Prerequisite: Mth 466; or Mth 413 and Mth 463. (Equivalent to St 561, 562,563.)

Mth 565,566
Advanced Probability Theory
3 hours each term 3 ①
A theoretical course, based on measure theory. Prerequisite: Mth 514.

Mth 571,572,573
Mathematical Theory of Viscous Flows
3 hours each term 3 ①
Boundary layer theory, theory of rotating fluids, magnetohydrodynamics, flow through porous media. Only one of the above topics treated each year. Sequence may be repeated once for credit. Prerequisite: Mth 473.

Mth 581,582,583 Functional Analysis
3 hours each term 3 ①
Topological vector spaces, generalized functions, operator theory. Prerequisite: Mth 516.

Mth 587,588,589 Banach Algebras
3 hours each term 3 ①
Function algebras, spectrum, structure space of a commutative Banach algebra; further properties of commutative Banach algebras; commutative harmonic analysis; self-adjoint Banach algebras; dual algebras; C°-algebras, and operator algebras in Hilbert spaces. Prerequisite: Mth 448, 516.

Mth 594
Selected Topics in Applied Mathematics
3 hours 3 ①
May be repeated for credit. Consent of instructor required.

Mth 595 Selected Topics in Algebra and Number Theory
3 hours 3 ①
May be repeated for credit. Consent of instructor required.

Mth 596 Selected Topics in Geometry
3 hours 3 ①
May be repeated for credit. Consent of instructor required.

Mth 597
Selected Topics in Classical Analysis
3 hours 3 ①
May be repeated for credit. Consent of instructor required.

Mth 598
Selected Topics in Numerical Analysis
3 hours 3 ①
May be repeated for credit. Consent of instructor required.

Mth 599
Selected Topics in Functional Analysis
3 hours 3 ①
May be repeated for credit. Consent of instructor required.

MEDICINE AND MEDICAL TECHNOLOGY

The School of Science offers a premedical curriculum preparing for entrance into standard medical schools. A combined premedical and pharmacy curriculum is available through the School of Pharmacy.

The medical college admission test of the Association of American Medical Colleges is given each spring and fall to all students who expect to apply during the next academic year for admission to a medical school. Further knowledge of the student's ability is obtained through frequent conferences between the student and his instructors and counselors.

The counselors for premedical students are Dr. R. H. Alvarado, Professor of Zoology, Chairman; R. D. Dyson, Associate Professor of Biophysics; W. Gamble, Associate Professor of Biochemistry; D. J. Reed, Professor of Biochemistry; Lewis J. Krakauer, M.D.

Premedical Curriculum

The curriculum prescribed below satisfies the entrance requirements of standard medical schools in the United States. The University of Oregon Medical School requires at least three academic years of preparatory work (138 term hours exclusive of credit in military science) for admission. However, the majority of entering medical students have had four years of preparatory work.

Freshman Year	*Hours*
English Composition (Wr 121)	3
General Chemistry (Ch 204,205,206)	15
Mathematics (Mth 110,111,112)	12
Humanities or social science	9
Physical education	3
Electives	6

Sophomore Year	
Approved courses in communication skills	3
Organic Chemistry (Ch 226,227,229)	8
General Physics (Ph 201,202,203)	12
Biochemistry (BB 350)	4
Biology (Bi 211,212,213)	15
General Psychology (Psy 200)	5
Personal Health (H 160)	2

Junior Year	
Approved courses in communication skills	3
Quantitative Analysis (Ch 235)	4
Comparative Vertebrate Embryology (Z 421)	5
Genetics (Bi 341)	4
Humanities or social science	4
Foreign language	12
Electives	16

Senior Year

Students who undertake a four-year program should plan their senior year in consultation with a premedical adviser. Of the 48 hours to be taken during the senior year, 24 hours should be selected from the following courses or approved equivalents: Comparative Histology (Z 461), Physiology (Z 431,432, or Z 434,435), Parasitology (Z 456), General Ecology (Bi 370), Cell Physiology (Bi 360, Z 433), Statistical Inference (St 421,422,423), Radiation Biology (GS 451,542,543), X-Ray Technology, (GS 461,462, 463), Biophysics (BB 331,332,333), Applied Differential Equations (Mth 321,322,323), Physical Chemistry (Ch 440,441,442 or Ch 423, 424,425).

Foreign language is not specifically required for admission to the University of Oregon Medical School; however, several medical schools have such a requirement. Students anticipating research in the medical sciences are advised to acquire a basic knowledge of German and French. Knowledge of a major foreign language is also recommended as a part of the cultural training of all prospective physicians.

At least 25 percent of all chemistry credit must be for laboratory work. Organic chemistry must include the chemistry of both aliphatic and aromatic compounds. Biochemistry will not satisfy the chemistry requirements.

Major in Science at Oregon State

The prospective medical student is urged to pursue a four-year program. Upon completion of the curriculum prescribed above, the student will be eligible for a Bachelor of Science degree in General Science or, if the appropriate courses are taken as electives, in a specific discipline such as chemistry, zoology, or mathematics.

Students enrolled in the curriculum prescribed above may enter medical school after their junior year. Before entering, the student should satisfy all requirements for senior standing and any other degree requirements which cannot be satisfied at the medical school. The first year of medical school may be counted in lieu of fourth year of undergraduate residence. Hours (48-hour maximum) taken during the first year of medical school will apply toward a general science major. Medical school biochemistry may be applied toward a major in chemistry, and physiology toward a degree in zoology. Most medical schools require that students have a bachelor's degree before beginning the third year there.

Medical Technology

The first three years of the curriculum in medical technology as given in regular courses at Oregon State University satisfy the new minimum requirements of the American Society of Clinical Pathologists. The fourth year includes additional courses needed to qualify for the B.S. degree in medical technology. These are offered at the University of Oregon Medical School. The counselors for students pursuing the curriculum are Professors K. S. Pilcher of the Department of Microbiology, Associate Professor F. L. Hisaw, Jr. of the Department of Zoology, and Professor P. K. Freeman of the Department of Chemistry. A combined medical technology and pharmacy curriculum is available through the School of Pharmacy.

The following curriculum is suggested as meeting the requirements of the American Society of Clinical Pathologists for admission to approved training schools. All approved schools of medical technology now require three years of college work and some a bachelor's degree. Students completing three years of work as outlined may receive a B.A. or B.S. degree from Oregon State University after completing a year of prescribed work in medical technology at the University of Oregon Medical School. The bachelor's degree is now a requirement for certification and registration as a medical technologist by the American Society of Clinical Pathologists.

Students who wish to take a longer period of time to fulfill medical technology requirements may do so with approval of the adviser.

Freshman Year	*Hours*
General Chemistry (Ch 204,205,206)	15
English Composition (Wr 121)	3
General Zoology (Z 201,202,203)	9
Mathematics for Biological, Management, and Social Sciences (Mth 161 or Mth 110)	4
Physical education	3
Approved electives	14

Sophomore Year	
General Microbiology (Mb 302,303)	6
Organic Chemistry (Ch 226,227,228,229)	10
General Physics (Ph 201,202,203)	12
Approved courses in communication skills	3
Approved humanities courses	9
Personal Health (H 160)	2
Approved electives	7

Junior Year	
Quantitative Analysis (Ch 234)	4
Pathogenic Microbiology (Mb 430, 431)	5
Physiology (Z 431,432)	8
Approved courses in communication skills	3
Approved social science courses	9
Approved science and other electives	19

Senior Year

(Medical School)

Medical technology 50
Mb 432, 433, Immunology and Serology, Ch 340, Elementary Physical Chemistry, Mth 150, Introduction to Computers (nonmajors), and BA 101, Introduction to Business are recommended electives.

MICROBIOLOGY

Microbiology deals with the forms and activities of bacteria, yeasts, molds, and viruses. Undergraduate students may elect a major in this field, either for a liberal arts degree or as preparation for professional service in microbiology and allied fields. The first two years of the microbiology curriculum include a thorough background in chemistry, biology, and liberal arts. During the third and fourth years students may specialize in some area of microbiology.

Many specialized fields of microbiology are available to the student and research worker. These include fundamental aspects such as the physiology, systematics, structure, or genetics of microorganisms, the applications of microbiology concerned with soil fertility, marine environments, food and dairy production and processing, industrial fermentation and biotransformation processes, sanitation, immunology, and human, animal, and plant diseases. Undergraduate studies in these areas will prepare students for admission to graduate programs in microbiology.

Undergraduate majors who plan to pursue a graduate program should elect the Microbiology curriculum. Undergraduate majors planning to terminate this training with the bachelor's degree may elect the Environmental Microbiology curriculum. This will prepare students to fill positions as health officers, sanitarians, and biotechnicians for private industry and government.

CURRICULA

Undergraduate majors: microbiology or environmental microbiology.

Graduate majors: microbial physiology, molecular biology, microbial genetics, virology, pathogenic microbiology, soil microbiology, industrial microbiology, food and dairy microbiology, marine and fresh water microbiology

GENERAL MICROBIOLOGY

Freshman Year	Hours
Reading and Conference: Orientation (Mb 405)	1
General Chemistry (Ch 204,205,206)	15
Mathematics (Mth 110,111,112)	12
Approved humanities or social sciences	9
English Composition (Wr 121)	3
Physical education	3
Electives	5

Sophomore Year

[1] Organic Chemistry (Ch 226,227,228,229)	10
Biology (Bi 211,212)	10
Quantitative Analysis (Ch 234)	4
General Microbiology (Mb 302,303)	5
Approved courses in communication skills	3
Approved humanities or social science	3
Personal Health (H 160)	2
Electives	11

Junior Year

	Hours
Applied Microbiology (MB 304,305, or equivalent)	4–5
Advanced General Microbiology (Mb 306, 307)	5
General Physics (Ph 201,202,203)	12
Elementary or General Biochemistry (BB 350 or BB 450, 451)	4–7
Approved courses in communication skills	3
Approved humanities or social science	6
Approved upper division microbiology	7
Electives	2–3

Senior Year

Approved upper division microbiology	11
Seminar (Mb 407)	3
Electives (mathematics, modern language, chemistry, and biology for those planning for advanced studies in microbiology)	34

[1] BB 350 substitutes for Ch 228.

ENVIRONMENTAL MICROBIOLOGY

Freshman Year	Hours
Reading and Conference: Orientation (Mb 405)	1
English Composition (Wr 121)	3
General Chemistry (Ch 204,205,206)	15
Mathematics (Mth 102)	4
Approved courses in humanities or social sciences	9
Physical education	3
Electives	13

Sophomore Year

[1] Organic Chemistry (Ch 226,227,228,229)	10
General Biology (Bi 211, 212)	10
General Microbiology (Mb 302,303)	5
Quantitative Analysis (Ch 234)	4
Approved courses in communication skills	3
Approved courses in humanities or social sciences	6
Personal Health (H 160)	2
Electives	8

Junior Year

General Physics (Ph 201,202,203)	12
Applied Microbiology (Mb 304,305 or equivalent)	4–5
Advanced General Microbiology (Mb 306, 307)	5
Approved courses in communication skills	3
Approved humanities or social science	3
Approved upper division microbiology	11
Electives	8

Senior Year

Seminar (Mb 407)	3
Approved upper division microbiology	15
Electives	30

[1] BB 350 substitutes for Ch 228.

GENERAL MICROBIOLOGY

Lower Division Course

Mb 130 Introductory Microbiology
3 hours any term 2 ① 1 ②
Microbiology applied to everyday living. Relationships of microorganisms to sanitation, foods, water, soil, industry, and medicine. Science elective for students in agriculture, home economics, engineering, humanities and social science.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

A maximum of six upper division hours in general biological science (Bi) and/or biochemistry and biophysics (BB) is allowed for microbiology credit.

Mb 302 General Microbiology
3 hours 3 ①
Emphasis on growth, cytology, physiology, genetics, and the role of microorganisms in nature. Prerequisite: one year of chemistry.

Mb 303
General Microbiology Laboratory
2 hours 2 ②
Laboratory methods in microbiology. Prerequisite: Bi 213 or concurrent enrollment or Mb 302 or concurrent enrollment.

Mb 304 Applied Microbiology
2 hours winter 2 ①
Application of microbiology to foods, water, soil, industry, and medicine. Prerequisite: Mb 303.

Mb 305
Applied Microbiology Laboratory
2 hours winter 2 ②
Laboratory methods of microbiological examination. Prerequisite: Mb 304 or concurrent enrollment.

Mb 306
Advanced General Microbiology
3 hours spring 2 ①½
Structure, function, metabolism, and physiology of procaryotes. Prerequisite: Mb 303; BB 350 or 451 or equivalent.

Mb 307 Advanced
General Microbiology Laboratory
2 hours spring 2 ③
Laboratory on structure and physiology of procaryotes. Prerequisite: Mb 306 or concurrent enrollment.

Mb 401 Research

Mb 403 Thesis

Mb 405 Reading and Conference
Terms and hours to be arranged

Mb 405 Reading and Conference
(Orientation) 1 hour fall or spring
Lecture-discussion course to acquaint undergraduate students in microbiology with the various fields available and with the staff working in different microbiological areas.

Mb 407 Seminar
1 hour each term. Staff

Mb 420 Systematic Microbiology (G)
3 hours winter 3 ①
Nomenclature and classification, methods in conventional and molecular taxonomy, biology of groups of bacteria. Prerequisite: Mb 303.

Mb 421
Systematic Microbiology Laboratory (G)
2 hours winter 2 ②
Methods in taxonomy and enrichment cultures. Prerequisite: Mb 420 or concurrent enrollment.

MEDICAL MICROBIOLOGY

Mb 430 Pathogenic Microbiology (G)
3 hours fall 3 ①
Bacteria pathogenic for man, emphasizing morphological, physiological, and disease-producing properties; methods of isolation and identification. Prerequisite: Mb 303; two years of chemistry.

Mb 431
Pathogenic Microbiology Laboratory
(G) 2 hours fall and winter 2 ③
Laboratory studies to accompany Mb 430.

Mb 432 Immunology and Serology
(G) 3 hours winter 3 ①
Theory and applications of immunity in infectious diseases and of serological reactions in diagnosis of disease and in medicolegal problems. Prerequisite: Mb 430.

Mb 433
Immunology and Serology Laboratory
(G) 2 hours winter 2 ③
Laboratory exercises to accompany Mb 432. Prerequisite: Mb 431.

Mb 434 Virology (G)
3 hours spring 3 ①
Properties of viruses, serological reactions, cultivation. Emphasis on animal viruses, including the major groups and their relation to disease. Prerequisite: Mb 430,432; BB 450,451.

Mb 435 Virology Laboratory (G)
2 hours spring 2 ③
Laboratory experiments to accompany Mb 434.

INDUSTRIAL AND ENVIRONMENTAL MICROBIOLOGY

Upper Division Courses

Mb 440 Food Microbiology (G)
3 hours fall 2 (1½)
Role of microorganisms in food spoilage, infection and intoxication; also basic principles in contamination control and germicidal treatment during processing, preparing, and distributing food for consumption. Prerequisite: Mb 303 or equivalent.

Mb 441 Food Microbiology Laboratory (G) 2 hours fall 2 ②
Laboratory techniques to accompany Mb 440. Prerequisite: Mb 440 or concurrent enrollment.

Mb 446 Dairy and Industrial Biotransformations (G)
3 hours winter 2 (1½)
Microbial culture technique for the production of cells, enzymes, metabolites, cultured dairy products, alcoholic beverages, solvents, fermented foods, organic acids, waste utilization and pollution control. Prerequisite: Mb 303 and one year of organic chemistry.

Mb 447 Dairy and Industrial Biotransformations Laboratory (G)
2 hours winter 2 ②
Laboratory techniques to accompany Mb 446. Prerequisite: Mb 446 or concurrent enrollment.

Mb 448 Microbial Ecology (G)
3 hours spring 3 ①
Soil and fresh water as a microbial ecological system including relationship to nutrient cycle, effects on microbial activity on plant and animal life. Prerequisite: Mb 303.

Mb 449
Microbial Ecology Laboratory (G)
2 hours spring 2 ③
Laboratory studies to accompany Mb 448. Prerequisite: Mb 448 or concurrent enrollment.

Mb 450 Marine Microbiology (G)
3 hours fall 3 ①
Ecology, function, and importance of microorganisms in the marine environment; microbiology of sedimentary processes, low temperature, hydrostatic pressure and salinity effects on marine microorganisms. Prerequisite: Mb 303 or equivalent or Oc 551.

Mb 454 Microbial Genetics (G)
3 hours spring 3 ①
Principles of microbial genetics and their application to modern microbiological problems. Prerequisite: Bi 341 or permission of instructor; BB 350 or BB 450, 451 or equivalent.

Mb 458 Bacterial Viruses (G)
3 hours spring 3 ①
Basic virology with emphasis on bacteriophage. Structure, replication, host-cell interactions, and genetics of bacteriophages. Prerequisite: Mb 303 or equivalent and Mb 306; BB 451 or equivalent.

Mb 470
Public Health Laboratory Methods
10 hours summer
Covers enteric bacteriology, tubercular sputum cultures, syphilis serology, fluorescent antibody methods, food poisoning and food infection analysis, water analysis, virology, mycology, and phenylketonuria. Given at the Oregon State Public Health Laboratory in Portland, full time, 5 days a week for the 8-week summer term. Prerequisite: two terms of organic chemistry, quantitative analysis, and pathogenic microbiology. Immunology recommended.

Graduate Courses
See also courses marked (*g*) and (*G*) above.

Mb 501 Research
Mb 503 Thesis
Mb 505 Reading and Conference
Mb 507 Seminar
Terms and hours to be arranged

Mb 550 Microbial Physiology
3 hours fall 3 ①
Regulation of cell metabolism; coding, structures, and functions. Prerequisite: BB 452 or equivalent; Mb 307 or equivalent.

Mb 552 Microbial Physiology
3 hours winter 3 ①
Control and mechanism of macromolecular synthesis in microorganisms. Prerequisite: Mb 550.

Mb 554 Microbial Genetics Laboratory
2 hours spring 2 ③
Genetic principles and laboratory instruction in microbial genetics; experimental procedures and modern techniques. Prerequisite: BB 451; Mb 454 or concurrent enrollment. Offered alternate years. Offered 1974-75.

Mb 562
Selected Topics in Microbiology
3 hours summer 3 ①
Nonsequence course designed to acquaint the student with recent advances. Topics vary and may include radiation microbiology, aerobic and anaerobic sporeformers, photosynthetic and autotrophic bacteria, relation of structure to function in bacteria, microbial nutrition. Prerequisite: Mb 307 or equivalent.

Mb 564
Selected Topics in Soil Microbiology
3 hours winter 3 ①
Recent advances and developing problems in soil microbial ecology, with critical evaluation of current literature. Prerequisite: Mb 449.

NURSING

Oregon State offers the one year of prenursing required for entrance into the University of Oregon School of Nursing in Portland. Director of the School is Miss Jean E. Boyle; adviser of students in the prenursing program is Miss Guhli Olson.

Freshman Year	*Hours*
English Composition (Wr 121)	3
Approved humanities courses	9
General Chemistry (Ch 104,105,106)	13
General Anthropology (Anth 105,106)	10
Nutrition (FN 225)	4
Backgrounds for Nursing (Nur 111)	3
Physical education	3
Electives (to be selected from humanities, social science, or science)	3

Nur 111 Backgrounds for Nursing
3 hours 3 ①
Modern social and health movements; relation to evolution of nursing as a profession; present aims and problems in nursing at home and abroad. Olson.

PHYSICS

Physics is the study of the fundamental structure of matter and the interactions of its constituents. Physicists are concerned with the continuing development of concepts needed for a precise description of nature and with experiments to test such concepts.

For students of the arts and letters, the study of physics provides an introduction to modern ideas about the most fundamental and elemental aspects of nature. For students in all scientific and technical fields, physics is a basic and indispensable tool. Students majoring in physics may prepare for careers in teaching, research, industry, or government.

The department offers two different approaches to the study of physics at the undergraduate level: one stressing more detailed and advanced preparation for graduate study in experimental and theoretical physics, and the other providing the fundamental ideas of physics as a science for students planning to do graduate work in one of the allied fields (biophysics, geophysics, atmospheric physics, chemical physics, physical oceanography) or to go into high school physics teaching or science administration. The program is flexible, so that the student may follow either plan, or a combination of the two, in accordance with his interest or aptitude.

Recommended preparation for undergraduate physics majors includes one year of biology, chemistry, and physics; four years of mathematics through analytic geometry; and two to three years of a foreign language, preferably French or German. Students who enter without this preparation may be delayed in their progress toward graduation.

Curriculum

Undergraduate majors: physics (with emphasis, if desired, in one of the allied fields (atmospheric physics, biophysics, geophysics, physical oceanography, or science administration).

Graduate majors: Atomic physics, nuclear physics, particle physics, solid state physics, theoretical physics.

Freshman Year	*Hours*
General Physics I (Ph 211,212)	8
Special Studies (Ph 199)	3
Calculus (Mth 111,112,113)	12
General Chemistry (Ch 204,205,206)	15
English Composition (Wr 121)	3
Approved courses in humanities or social sciences	6
Physical education	3
Officer education or other electives	4–0

Sophomore Year	
General Physics I (Ph 213)	4
Special Studies (Ph 199)	1
Physics II (Ph 322,323)	8
Calculus of Several Variables (Mth 211)	4
Applied Differential Equations (Mth 321, 322)	8
Approved sequence in biological sciences	9
Approved courses in communication skills	3
Approved courses in humanities and social sciences	6
Personal Health (H 160)	2
Officer education or electives	9

Junior Year

Approved courses in physics	12–21
Approved electives	9–0
Approved courses in communication skills	3
Approved courses in humanities or social sciences	6
Electives	18

Senior Year

Approved courses in physics	12–21
Approved electives	18–9
Electives	18

Graduation Requirement in Physics:

Students interested in pure physics and planning to go on to do graduate work in physics are required to take Ph 416,424,425,426,430,431, 432,433,434,435,451,452,474,475 and 476. Recommended are additional courses in mathematics or computer science and foreign languages.

Students interested in atmospheric physics, biophysics, geophysics, or physical oceanography are required to take Ph 416,424,425,430,431, 432,433,434,435,473 and 474. Approved electives to make up the balance of credits required for graduation in physics are 9 term hours selected from the courses listed below:

(a) Atmospheric physics: AtS 421,425,426, 433,434,435.
(b) Biophysics: Ch 334, 335, 336, 440, 441, 442; BB 481,482,483,490,491,492; Ph 475, 476.
(c) Geophysics: Ph 475,476; Ch 440,441, 442; Oc 531,532,561,562,583,584.
(d) Oceanography: additional courses in physics.

Additional elective courses in various specialties are recommended.

CURRICULUM IN ENGINEERING PHYSICS

Students electing the program in engineering physics should register in the School of Engineering.

Lower Division Courses

Ph 111,112,113 Abridged General Physics

3 hours each term — 3 ① 1 ②

Concepts in physical thought. Selected topics offer clear approaches to general ideas of physical theory and their relationships to Western society. Laboratory work accompanies lectures. Algebra and familiarity with graphs recommended as background.

Ph 115 From Fundamental Particles to the Cosmos

3 hours — 3 ①

The ideas of physics, their history, development, and application to problems facing mankind. Selected topics dealing with cosmology, motion, matter, and energy. No mathematical or laboratory exercises required. Not open to students with previous course in college physics.

Ph 199 Special Studies

Terms and hours to be arranged

Ph 201,202,203 General Physics

4 hours each term — 3 ① 1 ②

Application of physical principles to many fields. Fundamental concepts; dynamics, vibrations and waves, electricity, magnetism and light, modern topics in physics. Laboratory work accompanies lectures. Prerequisite: Mth 101, 102 or Mth 110 or equivalent.

Ph 204,205,206 Astronomy

3 hours each term — 3 ① 1 ②

Descriptive treatment. Coordinate systems, astronomical instruments, the solar system, star types and groupings, topics of current interest.

Ph 211,212,213 General Physics I

4 hours each term — 3 ① 1 ③

Mechanics, heat, sound, wave motion, electricity and magnetism, optics, and modern physics. For students in engineering and the natural sciences using the rudiments of calculus. Prerequisite: Mth 111. Corequisite: Mth 112 for Ph 211, Mth 113 for Ph 212.

Ph 214 General Physics I

4 hours — 3 ① 1 ③

Quantum theory, atomic, nuclear, and solid state physics. Laboratory measurements of properties of atomic systems.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (G) may be taken for graduate credit.

Ph 311,312,313 General Physics II

3 hours each term — 3 ① 1 ②

Kinetic theory, the electron, radioactivity, photoelectricity, thermionic emission, x-rays, electronic devices, gaseous conduction, cosmic rays, atomic physics, solid state, and nuclear physics. Prerequisite: Ph 213.

Ph 321,322,323 Physics II

4 hours each term — 3 ① 1 ②

Waves and oscillations, quantum physics, introduction to atomic, nuclear and particle physics, statistical and thermal physics. Prerequisite: Ph 213.

Ph 401 Research

Ph 403 Thesis

Ph 405 Reading and Conference

Ph 407 Seminar

Terms and hours to be arranged

Ph 416,417 Advanced Laboratory (g)

2 hours winter, spring — 2 ③

Laboratory exercises in solid state physics, atomic physics, nuclear physics. Prerequisite: Ph 430,434.

Ph 424,425,426 Mechanics (g)

3 hours each term — 3 ①

Kinematics, dynamics of particles and rigid bodies; generalized coordinates; relativity. Prerequisite: Ph 213 and Mth 322.

Ph 430 Electronics

3 hours — 2 ① 1 ③

Thermionic and solid state electronic devices and circuits. Prerequisite: Ph 214 or 323.

Ph 431,432,433 Electromagnetic Theory and Optics (g)

3 hours each term — 3 ①

Electromagnetic theory, principles and applications of geometrical and physical optics. Prerequisite: Ph 323; Mth 322.

Ph 434 Electrical and Magnetic Measurements

(g) 1 hour winter — 1 ②

Applications of electromagnetic theory to electric and magnetic measurements in the laboratory. Prerequisite: Ph 431 and concurrent enrollment in Ph 432.

Ph 435 Optics Laboratory (g)

1 hour spring — 1 ②

Applications of electromagnetic theory to geometrical and physical optics. Interference, diffraction, coherence. Prerequisite: Ph 432 and concurrent enrollment in Ph 433.

Ph 437,438,439 Electronics

3 hours each term — 2 ① 1 ②

Alternating current theory, circuits, electron tubes and solid state electronic devices, amplification, radio frequency generators, modulation, timing circuits, transmission and radiation, measurements at audio and high frequencies. Prerequisite: Ph 432 or GE 203. Not offered 1974-75.

Ph 441,442,443 Methods in Mathematical Physics (G)

3 hours each term — 3 ①

Some mathematical methods applied to classical and modern topics in physics including mathematical treatment of symmetry principles, action principles, and motion equations of physical systems. Prerequisite: Ph 214 or 323.

Ph 451,452 Thermal Physics (g)

3 hours each — 3 ①

Fundamental concepts and laws of thermodynamics, entropy and other characteristic functions, kinetic theory of gases, classical and quantum statistical mechanics. Prerequisite: Ph 214 or 323.

Ph 471,472,473 Selected Topics in Classical Physics (g)

4 hours each term — 3 ①

Mathematical treatment of classical theories; Lagrangian and Hamiltonian mechanics, Maxwell's equations, electromagnetic theory and physical optics; kinetic theory and statistical thermal physics. Prerequisite: Ph 213 or 223; Mth 322.

Ph 474,475,476 Selected Topics in Modern Physics (g)

3 hours each term — 3 ①

Quantum mechanics; application to atomic structure and atomic processes, properties, and interactions of atomic nuclei; structure and properties of the solid state; behavior of fundamental particles. Prerequisite: senior standing in physics or graduate standing in chemistry or engineering. Approval of instructor required.

Ph 481,482,483 Quantum Physics (g)

3 hours each term — 3 ①

Quantum mechanics, radiation and radiative transitions, atomic spectroscopy, molecular binding and molecular spectra, X-rays, nuclear structures, nuclear forces, nuclear models, particle scattering, particle physics. Prerequisite: Ph 426,433.

Graduate Courses

Graduate courses are given only when warranted by demand. The dates are given when courses are offered alternate years.

Ph 501 Research

Ph 503 Thesis

Ph 505 Reading and Conference

Ph 507 Seminar

Terms and hours to be arranged

Ph 515 Relativity

3 hours — 3 ①

Application of Lorentz transformation theory to mechanics and electrodynamics; general relativity. Prerequisite: Ph 522.

Ph 517,518,519 Quantum Mechanics

3 hours each term — 3 ①

Transformation theory, quantum mechanical equations of motion and their solutions, transition probabilities, illustrative applications. Prerequisite: Ph 426,476; or equivalent.

Ph 521,522 Dynamics

3 hours each — 3 ①

Lagrangian and Hamiltonian mechanics, canonical transformations, Hamilton-Jacobi theory, continua. Prerequisite: Ph 426.

Ph 531,532 Electromagnetic Theory

4 hours each — 4 ①

Mathematical treatment of classical theories of electricity, magnetism, and radiation. Prerequisite: graduate standing in physics or consent of instructor.

Ph 546,547,548 Introductory Solid State

3 hours each term — 3 ①

Mechanical and thermal properties of crystals, magnetic and dielectric behavior, band theory, theory of metals and semiconductors, superconductivity. Prerequisite: Ph 475, or graduate standing in chemistry, mathematics, or engineering.

Ph 549 Conduction of Electricity Through Gases

3 hours — 3 ①

Processes taking place at electrodes, in the gas, and at walls of tube; glow, arc, and spark discharges. Prerequisite: Ph 476 or graduate standing in chemistry, mathematics, or engineering.

Ph 551,552,553
Quantum Physics of Solids
3 hours each term 3 ①
Band theory and methods; Fermi gas; theory of metals; particle interactions, quasi particles; optical and transport properties of metals and semiconductors; theory of magnetism and superconductivity. Corequisite: Ph 574.

Ph 557,558,559
Statistical Thermophysics
3 hours each term 3 ①
Statistical mechanics, kinetic theory, thermodynamics. Prerequisite: Ph 521 previously or parallel.

Ph 563 Physical Optics
4 hours 4 ①
Abbé theory of diffraction, matrix methods in geometrical optics, Stokes' parameters, coherence. Prerequisite: Ph 532.

Ph 567,568,569 Quantum Field Theory
3 hours each term 3 ①
Quantization of scalar and vector fields. Applications to the physics of solid state, electrodynamics, and elementary particles. Prerequisite: Ph 519.

Ph 571,572,573 Nuclear Physics
3 hours each term 3 ①
Nuclear forces, elements of nuclear structure, and models of complex nuclei; nuclear scattering and reactions; electromagnetic transitions; alpha and beta decay; subnuclear particles. Prerequisite: Ph 519.

Ph 574
Selected Topics in Theoretical Physics
3 hours 3 ①
Topics vary from year to year. May be repeated for credit. Prerequisite: Ph 519.

Ph 575,576,577
Experimental Nuclear Physics
3 hours each term 2 ③
Radiation detectors and detecting systems, characteristics and operation of accelerators and reactors. Various experiments in nuclear physics using radioactive materials and the OSU machines. Prerequisite: Ph 571,572,573 previously or parallel.

Ph 584,585,586 Atomic Interactions
3 hours each term 3 ①
Elastic and inelastic scattering; structure of atoms, molecules, and ions; spectra; transition probabilities. Prerequisite: Ph 519.

Ph 587,588,589
Plasmas in Gases and Solids
3 hours each term 3 ①
Electrical, mechanical, and thermal properties of gases and solids; plasma theories and experiments. Prerequisite: Ph 519.

SCIENCE EDUCATION

Preparation for prospective teachers of biological and physical sciences and mathematics is offered by the Department of Science Education, a joint department within the College of Science and the School of Education. Students preparing to teach science in secondary schools may major in one of the sciences, or in general science, according to the degree of emphasis on subject matter or professional preparation. Combination of subjects to be taught and scope of preparation desired influence the choice of major school.

For description of program see SCHOOL of EDUCATION.

Summer Courses for Secondary School Science Teachers

The courses below are for high school teachers of science. They do not prepare for science research. Graduate standing is prerequisite to all these courses which are applicable toward the M.S. in science education for high school science teachers. These courses are not applicable toward a graduate major in one of the special sciences. For full descriptions see Summer Term Catalog.

AtS 595T
Selected Topics in Atmospheric Sciences
3 hours summer 3 ①
Meteorology for teachers.

BB 580T
Biochemistry for Science Teachers
3 hours summer 3 ①

Bot 521T Taxonomy and Field Botany
3 hours summer

Bot 522T Preparation of Botanical Materials 3 hours summer

Bot 530T Plant Physiology
3 hours summer

Bot 540T Plant Ecology
3 hours summer

Bot 571T Morphology of Lower Plants 3 hours summer

Bot 572T Morphology and Anatomy of Seed Plants 3 hours summer

Bot 590T Botanical Concepts
3 hours summer 3 ①

Ch 560T Physical Chemistry for Science Teachers 6 hours summer

Ch 561T
Advanced Inorganic Chemistry
6 hours summer

Ch 562T Organic Chemistry
6 hours summer

Ch 590,591T
Fundamental Principles of Chemistry
4 hours winter and spring 3 ① 1 ③
Application in fields of inorganic, organic, analytical, and physical chemistry; recent advances in chemistry. Prerequisite: one year each of chemistry, physics, and mathematics.

Ch 592T Inorganic Chemistry for College Teachers
3 hours summer 3 ① 1 ③

Ch 593T Analytical Chemistry for College Teachers
3 hours summer 3 ① 1 ③

Ch 594T Organic Chemistry for College Teachers
3 hours summer 3 ① 1 ③

Ch 595T Physical Chemistry for College Teachers
3 hours summer 3 ① 1 ③

Ch 596T Modern Inorganic Concepts in General Chemistry
3 hours summer 3 ① 1 ③

Ch 597T Radioisotope Chemistry for College Teachers
3 hours summer 3 ① 1 ③

Ent 555T Natural History of Insects
3 hours summer

GS 511T History of Biological Science
3 hours summer

GS 541T Bioecology
3 hours summer

Ggs 590T American Resources and their Conservation
4 hours summer 4 ①

G 517T Geology for Teachers
3 hours summer

G 530T Historical Geology
3 hours summer

G 550T Rocks and Minerals
3 hours summer

G 552T Geology of Northwest
3 hours summer

Mth 567,568,569T
Topics in Geometry for Teachers
3 hours summer 3 ①

Mth 590T
Selected Topics for Science Teachers
4 hours summer 4 ①

Mth 591,592T Selected Modern Topics for Mathematics Teachers
3 hours summer 3 ①

Ph 520T Astronomy
3 hours summer

Ph 581T Modern Physics
3 hours summer

Ph 582T Modern Physics
3 hours summer

Ph 583T Modern Physics
3 hours summer

Ph 590,591,592T
Recent Advances in Modern Physics
4 hours summer 3 ① 1 ②

Z 541T Heredity
3 hours summer

Z 554T Invertebrate Zoology
3 hours summer

Z 556T Collection and Preparation of Zoological Materials
3 hours summer

Z 560T Cells and Tissues
3 hours summer

Z 577T Ornithology
3 hours summer

Z 578T Field Natural History
3 hours summer

STATISTICS

The Department of Statistics offers undergraduate service courses, and graduate courses and programs leading to the M.A., M.S., and Ph.D. degrees in statistics and operations research, or to a minor for an advanced degree in other fields. Specialization is available in theory of statistics, operations research, biometry, or applied statistics. Students planning to major in statistics at the graduate level should have a minimum of mathematics through calculus and upper division work in statistics.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

St 311,312 Introduction to Statistics
3 hours each 3 ①
St 311: Descriptive methods, basic probability, sampling distributions, estimation and testing for proportions and means, two-sample problems, contingency tables. *St 312:* Basic regression, analysis, principles of experimental design and scientific inquiry, basic analysis of variance, Bayesian inference.

St 401 Research

St 405 Reading and Conference

St 406 Projects

St 407 Seminar
Terms and hours to be arranged

St 417 Computer Simulation (G)
3 hours 3 ①
Continuous and discrete models, simulation languages, numerical integration and difference equations, pseudorandom numbers, analysis of simulation experiments, optimization. Prerequisite: Mth 113; FORTRAN programming ability.

St 421,422,423
Introduction to Mathematical Statistics
(g) 3 hours each term 3 ①
St 421: Probability theory, random variables, expectation, central limit theorem, joint distributions, random sampling (can be used as a self-contained probability course). *St 422:* Concepts of inference, estimation theory and applications, confidence intervals, theory and applications of hypothesis testing, Bayesian inference. *St 423:* Regression analysis, chi square tests, analysis of variance, distribution-free methods, sequential sampling.

St 431 Design of Experiments (G)
3 hours 3 ①
Principles used, methods of analysis, comparison of designs, interpretation of results. Prerequisite: St 452.

St 435 Quantitative Ecology (G)
3 hours 3 ①
Statistical and mathematical models in ecological theory and application, quantitative theories of communities and populations, theory and practice of sampling and analyzing ecological data, parameter estimation. Prerequisite: St 452.

St 441 Sampling Methods (G)
3 hours 3 ①
Simple and stratified random sampling, systematic sampling, cluster sampling, double sampling, area sampling, analytical surveys, estimation of sample size. Prerequisite: St 452.

St 451,452,453 Statistical Methods
(G) 4 hours each term 3 ① 1 ②
St 451: Descriptive statistics, probability, discrete and continuous distributions (Poisson, binomial, normal, t, F, chi squared), estimation, hypothesis testing and confidence intervals, two sample comparisons. *St 452:* Simple and multiple regression analysis using the computer, stepwise techniques for model selection, partial correlation, examination of residuals. *St 453:* Analysis of variance, experimental design, randomized blocks and Latin squares, covariance analysis, factorial experiments, variance components. Prerequisite: Mth 95.

St 454 Applied Multivariate Analysis
(G) 3 hours 3 ①
Multivariate estimation, principle components, discriminant analysis, canonical correlation, canonical analysis, cluster analysis. Prerequisite: St 452.

St 461 Stochastic Processes in Biology
(G) 3 hours 3 ①
Generating functions, Markov chains, epidemic processes, birth and death processes, competition and predation. Prerequisite: St 421 or 544.

Mth 464,465,466 Theory of Probability
(G) 3 hours 3 ①
See MATHEMATICS for course description.

St 474 Inventory Analysis (G)
3 hours 3 ①
Mathematical models for deterministic and stochastic inventory systems. Prerequisite: Mth 464 or St 421.

St 475 Queues (G)
3 hours 3 ①
Theory of stochastic service systems including single and many server queues, queues in series, and simulation methods. Prerequisite: Mth 464 or St 421.

St 476 Reliability Models (G)
3 hours 3 ①
Stochastic models for the failure of complex systems, statistical evaluation of reliability, optimum maintenance policies. Prerequisite: Mth 464 or St 421.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

St 501 Research
St 503 Thesis
St 505 Reading and Conference
St 506 Projects
St 507 Seminar
Terms and hours to be arranged

St 521 Time Series Analysis
3 hours 3 ①
Principles of analysis of serially correlated data series in both time and frequency domains. Includes filtering, smoothing, Wiener prediction, spectral and cross-spectral analysis, and frequency response studies. Prerequisite: St 423.

St 531 Advanced Experimental Design
3 hours 3 ①
Foundation of experimental inference, factorial experiments, incomplete blocks, designs for regression analysis, sequential designs. Prerequisite: St 431.

St 532 Sampling Theory
3 hours 3 ①
The basic sampling model for equal probability selection, basic sampling methods, generalization of the basic model, common applications of the general theory, analytic surveys. Prerequisite: St 441 or 421 or 544.

St 534 Statistical Concepts in Genetics
3 hours 3 ①
Genetic probability, quantitative inheritance, designs for estimating genetic parameters, multiple trait selection. Prerequisite: St 452; one graduate course in genetics.

St 536 Systems Ecology
3 hours 3 ①
Current systems models and modeling concepts in ecological research; general systems theory. Prerequisite: St 435 or Mth 322.

St 541,542,543 Statistical Inference
4 hours each term 3 ① 1 ②
General models for parametric inference, methods of inference, maximum likelihood and likelihood-ratio methods, large sample methods, Bayesian inference, general linear models, multiple regression, design and analysis of experiments. Prerequisite: Mth 211; previous statistics course.

St 544,545,546 Theory of Statistics
3 hours each term 3 ①
Probability theory, distributions of random variables, limiting distributions, decision theory, sufficiency, point and interval estimation, hypothesis testing, analysis of variance, nonparametric inference. Prerequisite: Mth 211.

St 550 Distribution Theory
3 hours 3 ①
Random variables, characteristic functions, some properties of certain distributions, limit theorems, random sampling, order statistics. Prerequisite: Mth 312,341; St 546.

St 551,552 General Linear Hypothesis
3 hours each 3 ①
Multivariate normal and related distributions, moments and characteristic functions, estimation and distribution of estimators, principle of least squares, confidence regions and test of hypothesis, regression models, general weighted least squares. Prerequisite: St 550.

St 553 Multivariate Analysis
3 hours 3 ①
The generalized T^2 statistic, the Wishart distribution, the k-sample problem, discriminant functions, principal components, canonical correlation. Prerequisite: St 552.

St 561,562,563
Applications of Stochastic Processes
3 hours each term 3 ①
Various types of random processes occurring in the physical and biological sciences, engineering, and management. Prerequisite: Mth 413; St 546 or Mth 465. (Equivalent to Mth 561,562,563.)

St 564,565,566 Probability Theory
3 hours each term 3 ①
Basic theory of integration, random variables, convergence concepts, laws of large numbers, central limit theory, conditional expectations and martingale theory, probability measures on metric spaces. Prerequisite: Mth 413.

St 571,572,573 Operations Research
3 hours each term 3 ①
Statistical methods, queueing theory, linear programming, game theory. Prerequisite: Mth 211; 6 hours of upper division matrix algebra and/or probability.

St 574,575 Advanced Topics in Mathematical Programming
3 hours each 3 ①
Theory of linear programming; nonlinear programming, dynamic programming. Prerequisite: Mth 413,341; St 573.

St 576 Integer Programming
3 hours spring 3 ①
Theoretical and applied integer programming. Prerequisite: St 572.

St 577,578 Probabilistic Models in Operations Research 3 hours each 3 ①
Advanced treatment of the theory of operations research models of a probabilistic nature. Prerequisite: St 573 and 561.

St 581,582,583 Mathematical Statistics
3 hours each term 3 ①
Structure of probability spaces; decision theoretic approach to estimation and hypothesis testing including admissibility, completeness, Bayes and minimax procedures, sufficiency, unbiasedness, invariance, uniformly most powerful tests; individual study in literature of statistics expected. Prerequisite: St 546, Mth 413; St 550 or Mth 466.

St 591,592,593 Special Topics
3 hours each term 3 ①
Topics of special and current interest not covered in other courses.

VETERINARY MEDICINE

The College of Science offers a preparatory program designed to meet the general requirements for admission to the schools of Veterinary Medicine at Colorado State University, Fort Collins; Washington State University, Pullman, the University of California, Davis, and Iowa State University, Ames, Iowa. Prescribed courses, recommended electives, and other requirements vary with each professional school.

Satisfactory completion of the curriculum provides no guarantee of admission to any such institution. Individual applicants are accepted on a competitive basis and are usually admitted in their junior or senior year. Continued enrollment in preveterinary medicine at OSU cannot lead to completion of requirements for a baccalaureate degree in any field of science. Therefore, those wishing to receive baccalaureate degrees from OSU must transfer to a degree-granting major and complete all requirements of the major. Ordinarily such transfer should take place during a student's junior year.

Individuals interested in the profession should consult one of the advisers listed below regarding admission criteria other than academic course requirements.

Oregon residents may attend the above listed schools of Veterinary Medicine without paying out-of-state tuition fees (WICHE program). For further information concerning interstate agreements, write to: Commissioner, State of Oregon, Western Interstate Commission for Higher Education, P.O. Box 3175, Eugene, Oregon.

The OSU advisers for preveterinary students are Drs. J. Bone, D. E. Mattson, N. Patton, L. V. Swanson, and H. J. Jensen.

GENERAL PREVETERINARY REQUIREMENTS

	Hours
American National Government (PS 201)	5
Animal Science (approved courses)	5
Biochemistry (BB 450,451,452)	10
Biology (Bi 211,212,213)	15
Cell Physiology (Bi 360,361)	5
Comparative Vertebrate Embryology (Z 421)	5
English Composition (Wr 121,222,323)	9
General Chemistry (Ch 204,205,206)	15
Genetics (Bi 341)	4
Mathematics (Mth 110,111, or Mth 161, 162,163)	8–12
Microbiology (Mb 302,303)	5
Public Speaking (Sp 112)	3
Quantitative Analysis (Ch 234)	4
Pre-veterinary Medicine (VM 50x)	1
Approved humanities, social science, and science-related electives to complete 144 hours or 9 terms.	

ZOOLOGY

Basic requirements for an undergraduate major in zoology, whether for a liberal arts degree or as preparation for professional study at the graduate level, are included in the curriculum below. Approved electives in invertebrate zoology may be taken at a marine station.

Graduate students who have met the basic requirements for an undergraduate major in zoology may specialize in one of the following areas: (1) anatomy and embryology, (2) physiology, (3) invertebrate zoology and parasitology, (4) cellular biology, (5) natural history and ecology, (6) genetics. The department is well equipped for graduate study and research in each of these areas and is staffed by competent specialists.

Both undergraduate and graduate majors in zoology are urged to attend a summer session at a marine station or at an inland field laboratory. Candidates for the Ph.D. are strongly advised to spend one summer at a marine station.

Curriculum

Course requirements below should be arranged by years and terms in consultation with a faculty adviser.

Group A	Hours
English Composition (Wr 121)	3
Approved courses in communication skills	6
Approved courses in humanities	9
Approved courses in social sciences	9
General Chemistry (Ch 104,105,106,107 or Ch 204,205,206)	15
Organic Chemistry (Ch 226,227,229)	8
Elementary Biochemistry (BB 350)	4
Physics (Ph 201,202,203)	12
Mathematics	12
Personal Health (H 160) and physical education	5

Group B	Hours
Biology (Bi 211,212,213); or Zoology (Z 201,202) and Botany (Bot 201,202) and Microbiology (Mb 302,303)	15–19
Two courses selected from: Vert Structure (Z 327), Land Vertebrates (Z 371), Comp Anatomy (Z 422), Histology (Z 461)	10
Embryology (Z 421) or Devel Biology (Bi 425)	5
Physiology (Bi 360, and Z 432 or Z 435; or Z 431,432)	7–8
General Ecology (Bi 370)	3
Genetics (Bi 341)	4
Two courses selected from: Invert Zoology (Z 451,552), Gen Entomology (Ent 314)	9–10
Seminar (Z 407)	1
At least one course selected from: Modern language, quantitative analysis, statistics, computer programming, or advanced mathematics	4–12
Officer education or other electives	37–51

Lower Division Courses

Z 141 Human Heredity and Evolution
3 hours winter 3 ①
Introduction to genetic and evolutionary concepts for nonbiologists. Emphasis on application of genetic knowledge to human society; in particular to present and future political, ethical, and humanitarian problems. Graded on P-N basis only. DAWSON.

[1]Z 201,202,203 General Zoology
3 hours each term 2 ① 1 ③
Z 201, 202: Principles of animal biology. *Z 203:* Survey of invertebrates. HISAW.

[1]Bi 211,212,213 Biology
5 hours each term 3 ① 2 ②
See GENERAL BIOLOGICAL SCIENCE.

[1] Credit toward graduation is granted for only one of the following combinations: Z 201,202; Bi 211,212,213; or GS 101,102,103.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Z 311 Zoological Literature
1 hour spring 1 ①
Use of journals, reference works, bibliographic sources in zoological research. Graded on S-U basis only. HILLEMANN.

Z 321,322 Elementary Human Anatomy
3 hours fall, winter, or winter, spring 2 ① 1 ②
For physical education students. Prerequisite: Z 201,202,203, or equivalent. TILLMAN.

Z 327 Vertebrate Structure
5 hours spring 3 ① 2 ②
Gross and histological architecture of vertebrate organ systems with a developmental, comparative, functional, and evolutionary perspective. Prerequisite: one year of biology or Z 202. HILLEMANN.

Z 331,322 Physiology
3 hours fall and winter 2 ① 1 ②
For students in home economics, humanities and social sciences, and physical education; not for zoology majors. PRITCHARD.

Bi 341 Genetics
4 hours fall or spring 4 ①
See GENERAL BIOLOGICAL SCIENCE.

Bi 342 Genetics Laboratory
2 hours winter 2 ③
See GENERAL BIOLOGICAL SCIENCE.

Z 345 Evolution
3 hours winter 3 ①
Patterns and mechanisms, including elementary population genetics, selection, and speciation. Origin and history of life. Prerequisite: Bi 341. ROBERTS.

Z 351 Marine Invertebrate Ecology
5 hours spring 3 ① 2 ②
Littoral marine invertebrates from an ecological perspective, emphasizing biological characters of the environment. Prerequisite: one year of biology or zoology. BAYNE.

Bi 360 Cell Physiology
3 hours fall 3 ①
See GENERAL BIOLOGICAL SCIENCE.

Bi 361 Cell Physiology Laboratory
2 hours spring 1 ③ 1 ①
See GENERAL BIOLOGICAL SCIENCE.

Bi 370 General Ecology
3 hours fall or spring 3 ①
See GENERAL BIOLOGICAL SCIENCE.

Bi 371 Ecological Methods
2 hours fall or spring 1 ④
See GENERAL BIOLOGICAL SCIENCE.

Z 371 Land Vertebrates
5 hours winter 3 ① 2 ②
Structure, classification, evolution, distribution, and behavior of vertebrates. Prerequisite: one year of biology. STORM.

Z 401 Research
Terms and hours to be arranged

Z 403 Thesis
Terms and hours to be arranged

Z 405 Reading and Conference
Terms and hours to be arranged
Reading and reports on special topics.

Z 407 Seminar
1 hour each term 1 ①

Z 421
Comparative Vertebrate Embryology
(G) 5 hours fall 3 ① 2 ③
Descriptive, experimental, and evolutionary approach to the comparative study of early development of vertebrates. Prerequisite: Bi 213 or Z 202. HILLEMANN.

Z 422 Comparative Vertebrate Anatomy
(G) 5 hours winter 3 ① 2 ③
Descriptive, experimental, and evolutionary approach to the comparative study of development and anatomy of all organ systems of vertebrates. Prerequisite: Z 421. HILLEMANN.

Bi 425 Developmental Biology (G)
5 hours winter 3 ① 1 ① 1 ③
See GENERAL BIOLOGICAL SCIENCE.

Z 428 Invertebrate Embryology (G)
4 hours spring 3 ① 1 ③
Cleavage, organogeny, and larval development of marine and freshwater invertebrates. Prerequisite: Z 451,452. MORRIS.

Z 431,432 Vertebrate Physiology (G)
4 hours winter and spring 3 ① 1 ③
Cellular and organismic physiology of higher vertebrates. *Z 431:* General principles of pH buffers, catalysis, cell and tissue physiology. *Z 432:* Organ systems and interrelationships, homeostasis. Prerequisite: organic chemistry, and Bi 213 or Z 202, or Bi 360 for Z 432. ALVARADO, CONTE.

Z 434 General Physiology (G)
5 hours winter 3 ① 2 ③
Physiological processes primarily at the cellular level: cell chemistry and colloidal properties, metabolism, permeability and active transport, muscle contraction, conduction. Prerequisite: organic chemistry and two years of zoology. ALVARADO.

Z 435 Comparative Physiology (G)
5 hours spring 3 ① 2 ③
Comparative analysis of regulation in physiological systems; respiration, circulation, excretion, osmotic and ionic regulation, nervous systems and coordination. Prerequisite: Z 434 or Z 431 or Bi 360. PRITCHARD.

Z 437 Biochemical Adaptations (G)
3 hours spring 3 ①
The molecular and metabolic aspects of adaptation in animals. Prerequisite: BB 450,451. BROOKES, CONTE.

Z 451,452 Invertebrate Zoology (G)
5 hours fall and winter 3 ① 2 ③
Biology of larval and adult marine invertebrates; diversity of form, behavior, ecology, and physiology. Prerequisite: one year of biology or zoology. Consent of instructor required. BAYNE.

Z 453
Integrative Mechanisms in Invertebrates
(G) 3 hours spring 2 ① 1 ③
A study of hormonal systems, mechanisms of defense against disease, and pheromonal communication in invertebrates. Prerequisite: Z 452 or equivalent. BAYNE.

Z 454 Principles of Symbiosis (G)
4 hours spring 2 ① 2 ②
Compares basic principles of inter-organismic relationships: animal-animal, animal-plant, plant-plant, plant-animal. Prerequisite: general chemistry; two years of biology. OLSON.

Z 456 Parasitology (G)
4 hours winter 2 ① 2 ③
Morphology, life cycles, physiological adaptations, evolution, and distribution of parasitic animals. Prerequisite: two years of biology. OLSON.

Z 461
Comparative Vertebrate Histology (G)
5 hours fall 3 ① 3 ②
Comparative microscopic study of tissues and organs, emphasizing evolutionary relationships and functional adaptations. Prerequisite: two years of zoology. OWCZARZAK.

Z 462 Microtechnique (G)
4 hours spring 1 ① 3 ③
Preparation of histological, embryological, and cytological specimens for microscopic study. Prerequisite: two years of biology. OWCZARZAK.

Z 471 Ornithology (G)
3 hours spring 2 ① 1 ③
World families and distribution of birds; population biology; life histories; current literature. Prerequisite: Z 371. WIENS.

Z 472 Mammalogy (G)
3 hours fall 2 ① 1 ③
World families and distribution of mammals; population biology, life histories, current literature. Prerequisite: Z 371. STORM.

Z 473 Herpetology (G)
3 hours spring 2 ① 1 ③
World families and distribution of amphibians and reptiles; population biology, life histories, current literature. Prerequisite: Z 371. STORM.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

Z 501 Research

Z 503 Thesis

Z 505 Reading and Conference

Z 507 Seminar

Terms and hours to be arranged

Z 513 History of Zoology
3 hours winter 3 ①
Rise and development of zoological theories and laws. Prerequisite: one year of upper division zoology. HILLEMANN.

Z 521 Fetal Physiology
4 hours winter 2 ① 2 ③
Embryonic and fetal physiology; laboratory work on the later stages of morphogenesis (organogeny), student projects in developmental anatomy and physiology. Prerequisite: physiology and Z 421. HILLEMANN.

Z 527 Differentiation and Growth
3 hours fall 3 ①
Current investigations and theories of development with emphasis on tissue interactions in the control of differentiation and growth. Prerequisite: Z 421 or Bi 425 and BB 350. MORRIS.

Z 531,532,533 Mammalian Physiology
3 hours each term 3 ①
Neuromuscular system, central nervous system, autonomic system, circulation, respiration, gastroenterology, kidney secretion, metabolism. Prerequisite: physiology and organic chemistry. ALVARADO, HISAW.

Z 534,535,536
Mammalian Physiology Laboratory
2 hours each term 2 ③
Laboratory work accompanying Z 531,532,533. ALVARADO, HISAW.

Z 537 Endocrinology
3 hours fall 3 ①
Influence of endocrine glands on the physiology of the animal body, with special reference to mammals. Prerequisite: physiology and organic chemistry. HISAW.

Z 538 Endocrinology Laboratory
3 hours spring 3 ③
Laboratory work to supplement Z 537. Prerequisite: Z 537. HISAW.

Z 539 Selected Topics in Physiology
3 hours 2 ① 1 ③
Topics vary. May be repeated for credit. Prerequisite: Z 435 or equivalent. ALVARADO, HISAW, PRITCHARD, CONTE.

Z 542 Theoretical Genetics
3 hours spring 3 ①
Genetical phenomena discussed at advanced levels with emphasis on contemporary problems in research. Prerequisite: Bi 341 or equivalent. ROBERTS.

Z 551 Protozoology
4 hours fall 2 ① 2 ③
Morphology, physiology, and ecology of freshwater, marine, terrestrial, and parasitic protozoa. Prerequisite: Z 451,452.

Z 554
Selected Topics in Invertebrate Zoology
3 hours any term 2 ① 1 ③
Topics vary. May be repeated for credit. Prerequisite: Z 458 or 451 or 452. BAYNE, MORRIS, GONOR.

Z 561,562,563 Biology of the Cell
3 hours each term 2 ① 1 ③
Structure and physico-chemical properties of cellular components, cellular replication and differentiation, chromosomal organization and evolution. Prerequisite: Z 461,462, and organic chemistry. DORNFELD.

Z 565
Selected Topics in Cellular Biology
3 hours 1 ① 2 ③
Advanced laboratory training and theoretical discussion in the special fields of histochemistry, tissue culture, etc. Prerequisite: Z 461,462,561, 562,563, and biochemistry. DORNFELD, OWCZARZAK.

Z 566 Electron Microscopy
3 hours fall 3 ①
Biological applications of the electron microscope, including discussion of basic principles of electron optics and standard preparation techniques. Prerequisite: elementary physics; biochemistry; graduate standing in biological science. OWCZARZAK.

Z 567 Electron Microscopy Laboratory
3 hours winter 3 ②
Prerequisite: Z 566 previously or parallel and approval of instructor. Knowledge of photographic techniques desirable. OWCZARZAK.

Z 581 Zoogeography
3 hours winter 2 ① 1 ②
Distribution of animals, general principles, faunal areas of world and of North America. Prerequisite: Bi 370. STORM.

Z 583,584 Population Biology
4 hours fall and winter 3 ① 1 ②
Behavioral, ecological, and genetic approaches to the structure of populations. Emphasis on the theoretical and experimental and on current problems. Prerequisite: Bi 341, Bi 370. DAWSON, WIENS.

Z 585
Selected Topics in Vertebrate Ecology
3 hours spring 1 ① 2 ③
Advanced training in field and laboratory methods and discussion of current problems. Consent of instructor required. DAWSON, STORM, WIENS.

PROFESSIONAL STUDIES: Interdisciplinary Programs

HOTEL AND RESTAURANT MANAGEMENT

A joint program of the
School of Business and Technology and the School of Home Economics

Students in this program are preparing for a wide variety of management careers in the rapidly growing lodging and food-service industry, in hotels, motels, restaurants, clubs, condominiums, resorts, and residential developments. Professional course work is pirmarily in business administration and in food-service operations. Students may elect additional course work related to their special interests within the hotel and restaurant field. See recommended electives below.

Since requirements for the B.S. degree are the same in both schools, students in this program may register in either the School of Business and Technology or the School of Home Economics.

CURRICULUM

Freshman Year

Intro to Business, BA 101	4
English Composition, Wr 121	3
Intro to Bus Data Process, BA 131	3
Math for Bio/Mgmt/Soc Sc, Mth 161,162, 163	12
General Chemistry, Ch 201, 202, 203	9
Nutrition, FN 225	4
* Liberal arts and science electives	3
Other electives	6
Physical education, and Health, H 160	4
	48

Sophomore Year

Financial Accounting, BA 211	4
Managerial Accounting, BA 212	4
Quantitative Business Meth, BA 235	4
Intro to Mgmt Science, BA 238	4
Principles of Economics, Ec 213, 214	8
Foods, FN 215	5
General Microbiology, Mb 304	5
Special Studies, IM 199	2
Interpersonal Speech Comm, Sp 111	3
* Liberal arts and science electives	3
Other electives	5
Physical education	1
	48

Junior Year

Management Processes, BA 302	4
Production, BA 311	4
Marketing, BA 312	4
Finance, BA 313	4
Business Law, BA 315	4
Organizational Behavior, BA 361	4
Quantity Food Production, IM 311	4
Purchasing for Institutions, IM 440	5
Org and Mgmt of Food Serv, IM 445	5
Technical Report Writing, WR 327	3
* Liberal arts and science electives	4
Other electives	3
	48

Senior Year

Business and Its Environment, BA 495	4
Business Policy, BA 499	4
Seminar in Hotel Admin	5
Seminar in Restaurant Admin	5
Institution Experience, IM 450	4
Business Internship, BA 410	6
* Liberal arts and science electives	7
Other electives	13
	48

Recommended Electives

Meal Management, FN 313	3
Cultural Aspects of Foods, FN 416	3
Federal and State Food Reg, FST 421	2
Wholesale and Retail Meat, AnS 352	3
Consumer Behavior, BA 476	5
Contemp American Families, FL 240	3
Textiles for Interiors, CT 55[illegible]	2
Found of Rec and Leisure, RR 171	5
Phil and Hist Basis of Leisure, RR 421	4
Housing and Arch Phil, AA 178	3
Construction Materials, AA 121	2

* Institutional requirements of 36 hours in science, or 36 hours in social science, or 45 hours in science and social science together must be satisfied.

RESIDENTIAL INSTITUTION MANAGEMENT

A joint program of the
School of Business and Technology
Division of Health and Physical Education
School of Home Economics

This program provides students with professional preparation for careers as administrators of residential institutions, such as nursing homes, extended care facilities, retirement residences, homes for the aged, and homes for children. Administering these types of institutions requires competency in business management and institution management and knowledge of community health, human development, and human relations. Students may specialize either in facilities for the aged or for children.

Requirements for the B.S. degree are the same in all three sponsoring units. Students may register either in the School of Business and Technology, the Division of Health and Physical Education, or the School of Home Economics. Those interested should consult the head adviser in one of these areas.

COMMON REQUIREMENTS

English Composition, Wr 121	3
Personal Health, H 170	3
Physical education	3
	9

General Chemistry, Ch 201,202,203 or Ch 104, 105, 106	9–13
General Microbiology, Mb 304	5
Principles of Economics, Ec 213, 214	8
General Psychology, Psy 200	5
General Sociology, Soc 204	3
Mth for Bio, Mgmt, and Soc Sci, Mth 161, 162,163	12
Upper division biological science	3
	45–49

Intro to Bus Data Process, BA 131	3
Financial Accounting, BA 211	4
Managerial Accounting, BA 212	4
Quantitative Business Meth, BA 235	4
Management Processes, BA 302	4
Finance, BA 313	4
Organizational Behavior, BA 361	4
Adv Org Behavior, BA 461	4
Health Org and Mgmt Sys, BA 407	3
Bus Policy (health org), BA 499	4
Org Dynamics (health org), BA 494	4
Mgmt and Labor (health org), BA 496	4
	46

Food Service Sys, IM 410	3
Purchasing for Inst, IM 440	5
	8

* Human Development, Psy 311	3
Contemp American Families, FL 240	3
Family Relationships, FL 322	3
Personal and Family Finance, HM 341	3
Man and Leisure, RR 121	3
	15

Nutrition, FN 225	4
Comm and Non-commun Disease, H 332	3
Epidemiology, H 453	3
Comm Health Promotion, H 424	3
Health Agencies and Prog, H 426	3
Institutional Hygiene, H 434X	3
	19

Field Experience, BA 410/FL 406/ IM 406/H 475	6
Total common requirements	148–152

REQUIREMENTS FOR SPECIALIZATION

A. Health Service Organizations and Retirement Residences (nursing homes, extended care facilities, retirement homes, and homes for the aged)

Perspectives in Aging, FM 407	3
Adult Development and Aging, FL 407	3
Food for the Aged, FN 407	3
Electives	35–31

Suggested Electives:

Humanities: religious studies, history, literature; Sociology of Aging, Soc 407; Psych Basis of Human Movement, PE 311; Soc Basics of Human Movement, PE 312; Clothing and Human Behavior, CT 515; Industrial Environment Safety, IE 309, or Safety Education, H 360; Health Aspects of Gerontology, H 433; Control of Chronic Disease, H 432.

B. *Children's Residential Facilities*

* Child Development, FL 225	(3)
* Child Development, FL 311	3
* Dev in Middle Childhood and Adoles, FL 413	3
Family Nutrition, FN 325	2
Science or social science	3
Health of School-Age Child, H 451	3
Electives	30–26

Suggested Electives:

Humanities: religious studies, history, literature; Physiology, Z 331,332; Clothing and Human Behavior, CT 515; Psych Aspects of Late Adol (g), Psy 412; Behavior Deviations (g), Psy 462; Prins and Techs of Speech Correction (G), Sp 493; Industrial Environment Safety, IE 390, or Safety Education, H 360; Perceptual Motor Skill Training (g), PE 456.

* FL 225, FL 311, plus FL 413 required in Option B in lieu of Psy 311 in Common Requirements.

AGRICULTURE

FACULTY

As of January 1974

WILBUR TARLTON COONEY, M.S., Dean of Agriculture.

ASSOCIATE DEANS AND DIRECTORS Stevenson, Cox, Wood

DEAN EMERITUS Frederick Earl Price

PROFESSORS EMERITUS Compton, Dickinson, Dimick, Frazier, Hansen, Hill, Hollands, Litwiller, Long, McKenzie, Miller, Mumford, Muth, Potter, Powers, Richardson, Rodgers, Shaw, Sinnard, Wilster
EMERITUS ASSOCIATE PROFESSORS Langan, Oliver, Wolberg

RESIDENT INSTRUCTION

ELMER CLARK STEVENSON, Ph.D., Associate Dean and Director

ROGER KENNETH FENDALL, Ph.D., Head Adviser and Assistant Dean

Agricultural Chemistry: PROFESSORS Freed (department head), Terriere, Tinsley
RESEARCH ASSOCIATES: Buhler, Claeys, Gillett, Haque

Agricultural Economics: PROFESSORS Eisgruber (department head), Becker, Blanch, Brown, Castle, Edwards, Halter, Stoevener, Wyckoff
ASSOCIATE PROFESSORS Conklin, Johnston, Rettig, Smith, Stevens, Youmans
ASSISTANT PROFESSORS Fitch, Hammonds, Meier, Nelson

Agricultural Education: PROFESSORS Davis (department head)
INSTRUCTOR Oades

Agricultural Engineering Technology: PROFESSORS Davis (department head), Booster, Cropsey, Kirk, Long, Shearer, Willrich, Wolfe
ASSOCIATE PROFESSORS Brooks, Christensen
ASSISTANT PROFESSOR Wensink; INSTRUCTOR Tullis

Agronomic Crop Science: PROFESSORS COWAN (department head), Appleby, Chilcote, Ching, Frakes, Furtick, Goetze, Grabe, Kronstad, McGuire, Metzger
ASSOCIATE PROFESSORS Calhoun, Hardin
ASSISTANT PROFESSORS Burr, Stamp
RESEARCH ASSOCIATE Powelson

Animal Science: PROFESSORS Oldfield (department head), Bogart, Church, England, Gates (program director, Rangeland Resources), Ralston
ASSOCIATE PROFESSORS Kennick, Stormshak, Wu
ASSISTANT PROFESSORS Cheeke, Hohenboken, Krueger, Pulse, Reagan, Savelle, Swanson, Winward
RESEARCH ASSOCIATE Burkhart
INSTRUCTORS Adair, Gashler

Fisheries and Wildlife: PROFESSORS Warren (acting department (head), Bond, Horton, Kuhn, Long, Millemann
ASSOCIATE PROFESSORS Caldwell, Davis, Donaldson, Hall, Lannan, Verts, Vohs, Weber
ASSISTANT PROFESSORS Jarvis, McIntyre
SENIOR INSTRUCTOR Juntunen

Food Science and Technology: PROFESSORS Kifer (department head), Anglemier, Cain, McGill, Morgan, Schultz, Sinnhuber
ASSOCIATE PROFESSORS Beavers, Bills, Krumperman, Montgomery, Scanlan, Wrolstad

Horticulture: PROFESSORS Weiser (department head), Apple, Baggett, Mack, Roberts, Westwood
ASSOCIATE PROFESSORS Chaplin, Crabtree, Thompson, Wadsworth
ASSISTANT PROFESSORS Fuchigami, Richardson

Poultry: PROFESSORS Arscott (department head), Bernier, Harper, Parker
ASSISTANT PROFESSOR Dorminey

Soil Science: PROFESSORS Cheney (department head), Boersma, Dawson, Harward, Jackson, Moore, Simonson, Youngberg
ASSOCIATE PROFESSOR Volk; ASSISTANT PROFESSOR Ullery

Veterinary Medicine: PROFESSORS Wedman (department head), Bone, Peterson, Smith
ASSOCIATE PROFESSORS Helfer, Kistner, Snyder

THE SCHOOL OF AGRICULTURE performs three vital functions—instruction, research, and extension—which are closely tied to the human and natural resources of the State of Oregon and which support the economic development of the Pacific Northwest.

In RESIDENT INSTRUCTION the school is dedicated to helping each student reach his potential capacity. The faculty realize the importance of individual aims and abilities and through coursework, counseling, and extracurricular activities try to help each student discover and develop social, aesthetic, and ethical values as well as professional competence.

The AGRICULTURAL EXPERIMENT STATION conducts extensive scientific research in the agricultural, biological, social, and environmental sciences, and provides services and technical assistance to the agricultural and related industries of the State. Specific programs contribute to expanding income and employment, improving the nutrition and quality of food for the consumer of agricultural products, improving the economics and environment of rural communities, providing information for a more efficient management of Oregon's natural resources, and improving the quality of its environment.

The EXTENSION SERVICE provides informal educational opportunities and information to homemakers, businessmen—including farmers, fishermen, and foresters—community leaders, and youth throughout the State. It has an office in each county and a staff of specialists located on the campus.

Major program emphasis is directed to (1) Efficient use of Oregon's agricultural resources to improve farm family income and improve the quality of the environment. (2) Improved use of Oregon's forest resources to achieve maximum benefit from Oregon timberland for use in forest products, recreation, wildlife production, and watershed protection. (3) Improved family living through the efficient use of the family's economic and human resources. (4) The practical, managed exploitation of ocean resources for the economic, recreational, scientific, and aesthetic benefit of man. (5) Assisting the youth of Oregon to realize their full potential and to develop into responsible citizens by learning by doing in 4-H programs and related activities. (6) Helping Oregon communities to become more desirable places to live through improved utilization of the economic, social, and human resources available.

High School Preparation

Advances in technology and science in agriculture make the study of physical, biological, and social sciences and communications a vital necessity. The following preparation in high school is strongly recommended for students in agriculture: English, 4 units; mathematics, 3 units; physics, chemistry, and biology, 1 unit each; and social studies, 3 units.

Individual Counseling

Every student is considered an important individual. His or her study program is developed in personal consultation with a faculty adviser in the department in which the student has expressed a major interest. As early as possible students select a subject area and become associated with instructors and other students of similar interests. Initial or early counseling is based upon the student's high school record and all placement test scores. When preparation is found to be inadequate, the student is encouraged to enroll in courses providing the education, training, and experience necessary to help assure success at the university level even though such work may require the student to take one or more additional terms to complete a prescribed four-year curriculum.

University Honors Program

The Honors Program in this School is coordinated with the programs in other Schools and administered by the Director of the University Honors Program (see page 30). Information concerning eligibility and application forms may be obtained from the Director.

Tropical Agriculture Studies

The Tropical Agriculture Studies program, a reciprocal agreement with the College of Tropical Agriculture, University of Hawaii, provides a full academic year of undergraduate study in agricultural subjects dealing with tropical environment and production and use of food and fiber in the tropical regions of the world. Students in this program plan their study with their departmental adviser, using courses to be taken at the Honolulu campus.

Additional information may be obtained from the School of Agriculture or the office of the Director of International Education.

Job Opportunities

The diverse professional and occupational areas in agriculture include production, processing, and marketing of food and fiber; outdoor recreation; and efficient utilization of human and natural resources. Opportunities have expanded in variety, interest, and challenge in research, extension, teaching, communication, production, sales, and services. Curriculum options allow specialization in business, technical, or scientific aspects in preparation for these areas.

Graduation Requirements

To be eligible for a Bachelor of Science (B.S.) degree, a student must complete a minimum of 192 term hours including these requirements:

1. University requirements listed on page 14
2. Courses in Agriculture: 36 hours including 24 at upper division level
3. Communications courses: 18 hours
4. Liberal arts: 18 hours
5. One year of college-level inorganic chemistry, mathematics through Mth 60 or 161, and an additional year of college-level physical science electives
6. One year of college-level biological science
7. Satisfactory completion of a comprehensive examination in the use of the English language
8. Departmental requirements as listed on the following pages.

The professional degree of Bachelor of Agriculture (B.Agr.) and, through the Graduate School, advanced degrees of Master of Agriculture (M.Agr.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.) are also offered.

Work performance and personal conduct are evaluated and students are expected to maintain ethical, professional, and academic standards. Failure to meet such standards as adjudged by the faculty may be grounds for terminating a student's enrollment in a department or in the School.

Courses and Curricula in Agriculture

GENERAL AGRICULTURE

General Agriculture is a program designed for (1) students wishing programs of study not currently available in any of the agriculture subject matter departments—such as those involving a minor in journalism or in recreation, (2) students wishing to pursue two or more areas of specialization, or (3) students who have not selected a departmental major. For those students who are undecided but who are emphasizing certain subject-matter areas, programs may be developed with a General Agriculture adviser using the minimum requirements of at least one of the subject-matter curricula involved. Completion of a General Agriculture program leads to either the B.S. or B.Agr. degree.

Ag 100. **A Concept of Agriculture.**
2 hours fall. 2 ①
A perspective of agriculture in society and an understanding of educational and training opportunities.

Ag 407. **Seminar** (g)
Terms and hours to be arranged.

AGRICULTURAL CHEMISTRY

The Department of Agricultural Chemistry offers upper division and graduate courses in applied chemistry with particular emphasis on the chemical aspects of environmental problems.

Many pollution problems involve the distribution of some chemical in the environment. The definition and solution of such problems require the application of fundamental chemical concepts. Coursework in this area provides a valuable applied perspective for chemistry majors and is useful for students in engineering or the biological sciences whose interests are in resource management or environmental science.

Upper Division Courses

Courses numbered 400-499 and designed (g) or (G) may be taken for graduate credit.

AC 311. **Chemicals in the Environment.**
3 hours winter. 3 ①
Application of chemical concepts in the definition and solution of pollution problems; analytical considerations, thermodynamic factors influencing movement of chemicals, physical and metabolic transformations occurring in the environment. Prerequisite: Ch 106,226.

AC 401. **Research**
Terms and hours to be arranged.

AC 405. **Reading and Conference.**
Terms and hours to be arranged.

AC 407. **Seminar.**
Terms and hours to be arranged.

AC 410. **Chemical Analysis of Environmental Pollutants** (g)
3 hours winter. 1 ① 2 ③
Separation and analysis of chemical pollutants in the environment; considerations in sampling, separation techniques, methods of chemical analysis used for analysis and confirmation of trace levels of organic chemicals and heavy metals. Prerequisite: Ch 428.

AC 415. **Environmental Physical Chemistry.** (g)
3 hours fall. 3 ①
Concepts of physical chemistry which define the behavior of a chemical in the environment; thermodynamics of solution processes and surface phenomena as applied to the movement of chemicals in soil, air, and water; partitioning in biological systems; photochemical processes. Prerequisite: Ch 340.

AC 420. **Comparative Metabolism of Foreign Compounds.** (g)
3 hours spring. 3 ①
Metabolism of exogenous chemicals by plants and animals, and relation to environmental problems; comparative aspects of metabolic processes; interacting effects of other chemicals, nutritional and environmental variables; metabolic aspects of selective toxicity. Prerequisite: BB 450,451.

AC 425. **Chemistry of Air Pollution** (g) 3 hours spring. 2 ① 1 ③
Chemistry, formation, and behavior of air pollutants; sampling and analysis of air contaminants; biological and chemical effects of air pollutants on man and his environment. Prerequisite: Ch 203 and senior or graduate standing.

Graduate Courses

See also courses marked (g) and (G) above.

AC 501. **Research.**

AC 505. **Reading and Conference.**

AC 507. **Seminar.**
Terms and hours to be arranged.

AC 580. **Chemistry of Pesticides.**
3 hours fall. 3 ①
Chemical relationships of insecticides, herbicides, fungicides, and other pesticides to their physical and biological environments; movement in the environment; mode of action, non-toxic and chronic effects on biological systems; interactons in the environment. Prerequisite: BB 450,451,452 or equivalent.

AGRICULTURAL ECONOMICS

The curriculum in agricultural economics is planned to develop the skills of students in applying the analytic tools of economics to rural problems. Areas of study include the economics of agricultural business administration, commercial agriculture, water development, land-use planning, environmental quality, marine resources, rural poverty, recreation, health, education, and the impact of technological change.

This curriculum permits flexibility by providing for a large number of elective courses. With the help of his faculty adviser, a student can select from a broad range of electives and take many courses in interesting related fields.

BASIC CURRICULUM REQUIREMENTS

	Hours
Agriculture	
Agricultural Business Management	5
Agricultural Marketing	5
Agricultural Economics Analysis	9
Agricultural Economics Seminar	2
Electives in Agriculture	24
Communications	
English Composition	3
Written Communication	6
Oral Communications	3
Electives in Communications	6
Humanities and Social Sciences	
Principles of Economics	9
Macroeconomic Theory	9
Electives in Humanities and Social Sciences	15
Business	
Accounting	3
Biological and Physical Sciences	
Biology	12
Chemistry	9
Mathematics 111 or 163	8
Statistics	6
General and Electives	
Physical Education	5
Other Electives	53
TOTAL HOURS	192

Research and Reading and Conference courses provide opportunity for independent study in a particular area. Detailed information on advanced degree programs and course offerings is available upon request.

Lower Division Courses

AEc 111. **Agricultural Economics.**
3 hours winter. 3 ①
An introduction to farm management, marketing, agricultural business, finance, and land economics; farm policies and programs. Prerequisite: freshman or sophomore standing.

AEc 199. **Special Studies.**
Terms and hours to be arranged.

AEc 211. **Agricultural Business Management.**
5 hours spring. 3 ① 2 ①
Agriculture as a business; the decision-making process; tools of decision-making; acquiring, organizing, and managing land, labor, and capital resources; reasons for success and failure. Prerequisite: sophomore standing in agriculture. BECKER.

AEc 231. **Agriculture and the National Economy.**
3 hours. 2 ① 1 ②
Role and development of agriculture in the U. S., farm price and income policy. Rural problems: migration, poverty, declining social services, land use, economic growth, environmental conflicts.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit. See also courses in Department of Economics which may be taken as part of a graduate major in agricultural economics.

AEc 311. **Agricultural Marketing.**
5 hours winter. 5 ①
Marketing functions; marketing firms and their services; price determining forces; marketing problems; cooperatives. Prerequisite: Ec 213. HAMMONDS.

AEc 312,313,314. **Agricultural Economics Analysis.**
3 hours each term. 3 ①
AEc 312: Agricultural business profits as affected by product mix, input combinations, and level of output. *AEc 313:* Consumer behavior; markets and prices for agricultural commodities and factors. *AEc 314:* Prices in non-perfectly competitive markets; economic efficiency. Prerequisite: Ec 214; Mth 111 or 163; St 311,312 previously or parallel.

AEc 401. **Research.**

AEc 405. **Reading and Conference.**

AEc 407. **Seminar.**
Terms and hours to be arranged.

AEc 408. **Workshop.** (g)
Terms and hours to be arranged.
Workshops may be offered on a variety of subjects including income tax management, taxation, and other subjects traditionally falling within the field of agricultural economics.

AEc 411. **Public Policy in Agriculture.**
(g) 4 hours winter. 4 ①
Economic principles applied to agricultural adjustment; agricultural price and income policies established by State and Federal agencies. Prerequisite: AEc 314.

AEc 412. **Agribusiness Management.**
(g) 3 hours. 2 ① 1 ②
Management problems of farm and non-farm firms; application of economic principles and quantitative techniques to aid decision-making; use of computer to provide management information. Prerequisite: AEc 211 or equivalent. Not offered 1974-75.

AEc 414. **Farm Management.** (G)
4 hours fall. 2 ① 1 ③
Management principles and techniques for choosing and combining farm enterprises; farm plans with input factors nonrestrictive and restrictive; visits to observe farm organizational features. Prerequisite: AEc 312. CONKLIN.

AEc 418. **Federal Programs and the Farmer.** (g)
3 hours winter 1 ① 1 ②
Federal and State programs (ASC, SCS, FHA, BLM, FCES, FCIC, State agencies) as they affect the operation of Oregon farms and ranches. Prerequisite: senior standing. Not offered 1974-75.

AEc 421. **Plant Efficiency Analysis.**
(g) 3 hours winter. 1 ① 1 ②
Designing effective use of labor, materials, equipment, and fixed facility inputs for the production, processing, handling, and marketing of agricultural products. Techniques to assist management in selecting alternative systems. Prerequisite: AEc 311 or 314. Not offered 1974-75.

AEc 425. **Property Appraisal.** (g)
3 hours spring. 2 ① 1 ③
Property value theory and techniques, fee and agency appraisal objectives and methods, field work in appraising farm and other classes of property. Prerequisite: senior standing. BLANCH.

AEc 431. **Agricultural Finance.** (G)
3 hours spring. 3 ①
Finance requirements, principles, and problems; credit role, arrangements, and costs; credit sources; risk; intergeneration transfer of estates. Prerequisite: Ec 214. BLANCH.

AEc 440. **Livestock Economics.** (g)
3 hours fall. 3 ①
Economic and financial phases; cost-price relationships; market structure; problems and prospects in Pacific Northwest. Prerequisite: senior standing.

AEc 461. **Land and Water Economics.**
(g) 3 hours winter. 3 ①
Economic principles affecting natural resource use, benefits, and costs of development and conservation and their distribution among uses and users; policy issues in natural resource management. Prerequisite: Ec 214 or equivalent. STOEVENER.

AEc 462. **International Agricultural Development.** (G)
3 hours winter. 3 ①
Supply and demand for agricultural resources and products; population pressure on land: economic principles governing value and use of resources; institutional factors. Prerequisite: Ec 214. CONKLIN.

AEc 471. **Managerial Economics.**
(G) 3 hours spring. 2 (1½)
Business policies and decision-making tools in agricultural supply and marketing firms; techniques of discounted cash flow analysis, benefit-cost ratios. Prerequisite: AEc 314 or equivalent.

AEc 481. **Natural Resources Policy.** (G)
3 hours spring. 3 ①
Public decision-making in natural resource use and development; analysis of public investments and social control over resource use. Prerequisite: AEc 314 or equivalent.

Graduate Courses

See also courses marked (g) and (G) above.

AEc 501. **Research.**

AEc 503. **Thesis.**

AEc 505. **Reading and Conference.**

AEc 507. **Seminar.**
Terms and hours to be arranged.

AEc 508. **Workshop.**
Terms and hours to be arranged.
Application of agricultural economics to problems of agricultural marketing, policy, finance, farm management, and natural resources.

AEc 510. **Advanced Farm Management.**
9 hours summer (6 weeks). 5 ④ 1 ④
Economic principles, concepts, and procedures basic to management competence; farm record analysis, farm organization; developing material for teaching and counseling farmers. BECKER.

AEc 517,518. **Product and Factor Markets.**
3 hours fall and winter. 3 ①
The market, household, and firm under perfect and imperfect competition; economic problems of production, distribution, and resource allocation in agriculture. Prerequisite: AEc 313 or equivalent. EDWARDS, JOHNSTON.

AEc 519. **Efficiency and Welfare.**
3 hours spring. 3 ①
Theory of economic optima and analysis of technical and institutional conditions for failure of their achievement, criteria for social decision making. Prerequisite: AEc 518. STOEVENER.

AEc 520. **Research Methodology.**
3 hours fall. 3 ①
Logic, theory, and statistics in economic research. Offered alternate years. Offered 1974-75.

AEc 521. **Advanced Production and Consumption Economics.**
3 hours spring. 3 ①
Price and output determination in product and factor markets, application to price and output problems in agriculture and natural resource markets. Prerequisite: AEc 518; Mth 112. RETTIG.

AEc 522. **Advanced Production and Consumption Economics.**
3 hours fall. 3 ①
Income distribution under competitive and imperfectly competitive conditions, problems of agriculture and natural resource development. Prerequisite: AEc 521. Offered alternate years. Offered 1974-75.

AEc 523. **Analysis of Agricultural Policies.** 3 hours spring. 3 ①
The formation of agricultural policy in the context of national economic policy; evaluation of past, current, and prospective policies. Prerequisite: AEc 519.

AEc 524,525. **Decision-Making Theory and Application.**
3 hours fall and spring. 3 ①
AEc 524: Theoretical production, cost, and revenue relationships with application to the firm under conditions of certainty. *AEc 525:* Application to the firm under conditions of risk and uncertainty. Prerequisite: Mth 211, AEc 524. Offered alternate years. Not offered 1974-75. BROWN, HALTER.

AEc 544,545. **Aggregate Economic Analysis.**
3 hours fall and winter. 3 ①
Interrelationships between agricultural, nonagricultural, and public sectors; effects of monetary, fiscal, and resource supply policies on income and employment in the agricultural sector; effects of changes in the agricultural sector on aggregate economic activity. Prerequisite: AEc 518; Ec 476.

AEc 561. **Economics of Natural Resource Development.**
3 hours fall. 3 ①
Welfare economics and benefit-cost analysis. Allocation of natural resources over time and among uses. Optimum and multiple use concepts. Prerequisite: AEc 519 or equivalent. Offered alternate years. Offered 1974-75. STEVENS.

AEc 567. **Applied Econometrics.**
3 hours winter. 2 (1½)
Mathematical and statistical analysis applied to problems of specification, estimation, and interpretation of practical economic problems. Prerequisite: St 453. HAMMONDS.

AEc 568. **Econometrics.**
3 hours spring. 3 ①
Mathematics and statistics applied to problems in specification, estimation, and verification of economic relationships. Prerequisite: St 453,481; AEc 567. Offered alternate years. Offered 1974-75. BROWN.

AEc 572. **Agricultural Marketing.**
3 hours fall. 3 ①
Objectives; costs and organization; margins, transportation, advertising, and cooperative theory; problems. research, and progress. Prerequisite: AEc 518. Offered alternate years. Not offered 1974-75.

AEc 573. **Agricultural Price Analysis.**
3 hours spring. 3 ①
Supply and demand theory; statistical procedures. Prerequisite: AEc 517; St 452 or 457. HAMMONDS.

AEc 585,586. **Mathematical Economics.** 4 hours winter and spring. 4 ①
Application of mathematics to economics. Prerequisite: Mth 211. AEc 586 offered alternate years. Offered 1974-75. HALTER.

AGRICULTURAL EDUCATION

The Department of Agricultural Education is a joint department within the Schools of Agriculture and Education. It trains teachers and supervisors of agriculture for secondary schools and for schools and classes of adult farmers and young men not enrolled in regular day schools. For requirements, graduate credit, and course listing see SCHOOL OF EDUCATION.

AGRICULTURAL ENGINEERING TECHNOLOGY

The curriculum in Agricultural Engineering Technology (AET) is offered by the Department of Agricultural Engineering, which is jointly administered by the Schools of Agriculture and Engineering. For other curricula see SCHOOL OF ENGINEERING.

The AET curriculum provides a broad course of study with opportunities for some specialization. A student will acquire a background in the agricultural sciences, business, communicative and manipulative skills, and basic engineering principles. This course of study qualifies him for work of a technical nature in many phases of industry, public and self-employment.

For a B.S. degree in AET, either of the two following options is recommended. Full consideration will be given for comparable course work taken in a community college or other college and to advanced placement for students with specialized skills which may be acceptable in place of recommended courses.

BUSINESS OPTION

Freshman Year	Hours
English Composition (Wr 121)	3
General Chemistry (Ch 201,202,203)	9
Mathematics (Mth 161,162,163)	12
Mechanical Prob in Agric (AET 101,102)	4
General Biology (GS 101,102,103)	12
Graphics (GE 115)	3
Physical education and personal health	4
Sophomore Year	
Principles of Economics (EC 213,214)	8
Animal or Poultry Science (AnS 121 or P 121)	3
Soils (Sls 210)	5
Abridged General Physics (Ph 111,112)	6
Fundamentals of Speech (Sp 111 or 112)	3
Plane Surveying (CE 226)	3
Financial and Managerial Accounting (BA 211,212)	8
Agricultural Business Management (AEc 211)	5
Quantitative Business Methods (BA 235)	4
Introduction to Management (BA 238)	4
Physical education	1
Junior Year	
Journalism or Tech Report Writing (J 111 or Wr 327)	3
Computer Applications (AE 356)	3
Statics and Strength of Materials (AET 421)	3
Dynamics of Solids and Fluids (AET 422)	3
Heat Energy Processes (AET 423)	3
Engine Theory and Operation (AET 312)	3
Soil, Water, and Irrigation (Sls 311)	3
Agricultural Processing (AET 371)	3
Production (BA 311)	4
Marketing (BA 312)	4
Finance (BA 313)	4
Electives	6
Seminar (AE 407)	1
Communication elective	6
Senior Year	
Pumps and Irrigation (AET 321)	3
Motor Vehicles (AE 313)	3
Farm Buildings (AET 361)	3
Farm Implements (AET 391)	3
Seminar (AE 407)	1
Farm Electricity (AET 331)	3
Land Drainage (AET 319)	3
Organization and Management Theory (BA 302)	4
Business and Environment (BA 495)	4
Humanities and social science electives	10
Electives	9

TECHNOLOGY OPTION

Freshman Year	Hours
English Composition (Wr 121)	3
General Chemistry (Ch 201,202,203)	9
Animal or Poultry Science (AnS or P 121)	3
Mathematics (Mth 60,110,111)	12
Mechanical Prob in Agric (AET 101,102)	4
General Biology (GS 101,102,103)	12
Graphics (GE 115)	3
Physical education and personal health	4
Sophomore Year	
Soils (Sls 210)	5
Abridged General Physics (Ph 111,112)	6
Fundamentals of Speech (Sp 111 or 112)	3
Principles of Economics (Ec 115 or 213)	4
Agricultural Business Management (AEc 211)	5
Plane Surveying (CE 226)	3
Basic Accounting and Financial Anal (BA 217)	3
Physical Education	1
Humanities and social science electives	6
Communication elective	3
Electives	9
Junior Year	
Journalism or Tech Report Writing (J 111 or Wr 327)	3
Crop Production (ACS 211)	5
Computer Applications (AE 356)	3
Agricultural Processing (AET 371)	3
Engine Theory and Operation (AET 312)	3
Soil, Water, and Irrigation (Sls 311)	3
Statics and Strength of Materials (AET 421)	3
Dynamics of Solids and Fluids (AET 422)	3
Heat Energy Processes (AET 423)	3
Seminar (AE 407)	1
Communication elective	3
Electives	14
Senior Year	
Motor Vehicles (AE 313)	3
Farm Buildings (AET 361)	3
Farm Implements (AET 391)	3
Business Law (BA 315)	4
Seminar (AE 407)	1
Pumps and Irrigation (AET 321)	3
Farm Electricity (AET 331)	3
Land Drainage (AET 391)	3
Humanities and social science electives	8
Electives	16

Lower Division Courses

AET 101,102. Mechanical Problems in Agriculture.
2 hours fall, winter. 1 ① 1 ②
Lectures and elementary problems. LONG.

AET 199. Special Studies.
Terms and hours to be arranged.

AET 211. Agricultural Engineering Survey.
3 hours any term. 1 ① 2 ②
Mechanics, hydraulics, soil conservation, and electricity applied to farm problems. Field trips may be required. Prerequisite: Mth 50 or equivalent. LONG.

AET 221. Agricultural Mechanics.
3 hours any term. 1 ① 2 ③
Hand and power tools for wood and metal working, roof framing, arc and acetylene welding; construction of wood and metal farm appliances; concrete work. Field trips may be required. CHRISTENSEN.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

AET 312. Engine Theory and Operation. 3 hours 1 ① 2 ②
Engine construction, operational theories and principles, lubrication, fuels and oils, emissions, and preventive maintenance; small engine overhaul, measurements, operation, and storage. Field trips may be required. Prerequisite: Ch 203; Ph 111. KELSO.

AET 319. Land Drainage.
3 hours winter. 2 ① 1 ③
Surface and subsurface drainage systems; ponds and earth dams; erosion control. Field trips may be required. Prerequisite: Sls 210. BROOKS.

AET 321. Pumps and Irrigation.
3 hours fall. 2 ① 1 ③
Sprinkler and gravity irrigation systems; irrigation pumps; wells. Field trips may be required. Sls 311 recommended. WOLFE.

AET 325. Instructional Analysis in Agricultural Mechanics.
3 hours spring. 1 ① 2 ③
Analysis and self-development of competencies in agricultural mechanics with emphasis upon preparation to teach vocational agriculture. CHRISTENSEN.

AET 326. Sprinkler Irrigation.
3 hours spring. 3 ①
Operational principles of sprinkler irrigation equipment, application of irrigation water, frost protection, and temperature control. Prerequisite: Sls 210. SHEARER.

AET 331. Farm Electricity.
3 hours winter. 2 ① 1 ③
Fundamentals, electrical codes, electrical motors, and use of electricity in agriculture. Field trips may be required. Prerequisite: AET 211 or equivalent. CROPSEY.

AET 341. Use of Explosives.
2 hours winter. 1 ① 1 ③
Removing stumps, constructing drainage ditches, and rock blasting; 30 hours of Saturday field work arranged. Field trips may be required. Prerequisite: senior standing in schools of Agriculture, Engineering, Forestry, and Science.

AET 361. Farm Buildings.
3 hours spring. 1 ① 2 ②
Building services, economical utilization, materials and types of construction, and creative farmstead planning. Field trips may be required.

AET 371. Agricultural Processing.
3 hours fall. 2 ① 1 ③
Processing and handling agricultural materials. Field trips may be required. Prerequisite: Ph 111. BOOSTER.

AET 391. Farm Implements.
3 hours fall or spring. 2 ① 1 ③
Power farming implements; operation, maintenance, adjustments, calibration and use. Field trips may be required. Prerequisite: Mth 50 or equivalent. BOOSTER.

AET 401. Research.

AET 405. Reading and Conference.

AET 406. Projects.

AET 407. Seminar.

AET 408. Workshop.
Terms and hours to be arranged.

AET 421. Statics and Strength of Materials.
3 hours fall. 2 ① 1 ②
Statics and strength of materials and their applications in agricultural technology. Field trips may be required. Prerequisite: Ph 111.

AET 422. Dynamics of Solids and Fluids.
3 hours winter. 2 ① 1 ②
Dynamics of solids and fluids and their applications in agricultural technology. Field trips may be required. Prerequisite: AET 421. BROOKS.

AET 423. **Heat Energy Processes.**
3 hours spring. 2 ① 1 ②
Fundamentals of heat energy process and their applications in agricultural technology. Field trips may be required. Prerequisite: Ph 111. BOOSTER.

AET 441. **Food Engineering.**
3 hours fall. 3 ①
Mechanics of solids and fluids fundamental to food plant operations. Field trips may be required. Prerequisite: Mth 112; Ph 203; FST 224. KIRK.

AET 442. **Food Engineering.**
3 hours winter. 2 ① 1 ②
Electricity and thermodynamics applied to problems in food plant management. Field trips may be required. Prerequisite: AET 441. KIRK.

AET 443. **Food Engineering.** (G)
4 hours spring. 3 ① 1 ②
Thermodynamics and heat transfer applied to the processing of food. Field trips may be required. Prerequisite: AET 442. KIRK.

AET 451. **Environmental Housing.** (g)
3 hours winter. 1 ① 2 ②
Structural materials, design, and methods of construction; typical dwellings using planning and building standards developed by Agricultural Experiment Station and other research. Field trips may be required. Prerequisite: AA 178 and senior standing.

AET 481. **Agricultural Pollution Control.** (g) 3 hours 3 ①
Pollutants of agricultural origin and their effects upon environmental quality; problems caused by animal, crop production, and products processing; control methods. Field trips may be required. Prerequisite: senior standing.

AET 482. **Rural Water and Waste Systems.** (g) 3 hours. 3 ①
Planning and design for camps, parks, and homes in rural areas. Field trips may be required. Prerequisite: senior standing.

Graduate Courses
See also courses marked (*g*) and (*G*) above.

AET 501. **Research.**
AET 503. **Thesis.**
AET 505. **Reading and Conference.**
AET 506. **Projects.**
AET 507. **Seminar.**
AET 508. **Workshop.**
Terms and hours to be arranged.

AGRONOMIC CROP SCIENCE

Agronomic Crop Science instruction is involved primarily with the production and improvement of crop species—in growing, protecting, developing, and improving plants which supply the world's population's food, livestock feed, seed, industrial raw materials, soil and watershed protection, lawns, turf, and wildlife crops. Courses integrate the scientific principles of soils, physics, chemistry, botany, and genetics as the student deals with theories and practices of crop management and improvement.

Undergraduate curricula are flexible enough to provide for the student's individual professional needs and interests and for a broad-based general education by allowing electives in other schools throughout the University. Graduates in Agronomic Crop Science are prepared for careers in business, industry, farming, research, agricultural chemicals, seed production, seed technology, communications, conservation, and education. Positions are available in agricultural experiment stations and extension services, state departments of agriculture, food-processing companies, insurance agencies, and commercial firms dealing in the manufacture, processing, and sale of farm products, chemicals, and seed. Counselors provide curricular guidance, and aid in professional extra-curricular activities, career decisions, and job placement.

M.S. and Ph.D. degree programs allow students to study under the guidance of nationally known scientists in cereal breeding and production, forage, and turf grass breeding; production management; weed control; pasture production and management; seed production and technology; and crop physiology. Oregon's unusual diversity of crops, soils, and climates and the facilities of the Agricultural Experiment Station make possible a wide range of research.

For the B.S. degree the following courses are the recommended minimum. Special interests or educational backgrounds of some students may require limited modification of these minimum requirements with the approval of the student's adviser.

RECOMMENDED MINIMUM

	Hours
Agriculture, 57 hours (24 upper division)	
Agronomic Crop Science	31
Other than major department	26
Communications, 18 hours	
English Composition	3
Speech	3
Electives	12
Humanities and social science electives	18
Biological and Physical Sciences, 34-43 hours	
Botany (Bot 201,202,203) or Biology (Bi 211,212,213)	12–15
Chemistry (Ch 104,105,106 or 201,202,203)	9–13
Organic Chemistry	3
Mathematics (Mth 60 or 161)	4
Physics (Ph 111 or 201)	3–4
Physical science elective	3–4
Health and physical education	5
Free electives	51–61

PEST MANAGEMENT OPTION

Elective hours may be used to include courses in entomology, nematology, weeds, and plant pathology, integrating all of these disciplines toward a specific goal of crop pest management. See curriculum in SCHOOL OF SCIENCE (BOTANY)

Lower Division Courses

ACS 199. **Special Studies.**
Terms and hours to be arranged.

ACS 211. **Crop Production.**
5 hours fall or spring. 3 ① 2 ②
Fundamental principles and illustrative facts; planting, culture, rotation, production, hazards, quality, and improvement of cereals, forages, and other agronomic crops. Identification of crop and weed plants and seeds. For all students.

Upper Division Courses
Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

ACS 311. **Potato Production.**
2 hours winter. 2 ①
Production; improvement; storage; cost; marketing; distribution; uses; experimental work; varietal studies; identification, judging, and scoring. Prerequisite: ACS 211 or Hrt 111, or Bot 201.

ACS 313. **Lawns and Turfs.**
2 hours fall. 1 ① 1 ②
Turf plants and seeds; seedbed preparation, seeding, fertilization management, weed and pest control for lawns, golf courses, grass nurseries, etc. Prerequisite: ACS 211 or Hrt 111, or Bot 201.

ACS 322. **Cereal Crops.**
4 hours winter. 3 ① 1 ②
Production, distribution, adaptation, ecological relationships, morphological and taxonomic relationships, markets, utilization, and quality aspects. Prerequisite: ACS 211.

ACS 324. **Pasture Production and Management.**
3 hours spring. 2 ① 1 ②
Cultivated forage species, varieties, and mixtures; pasture establishment, production, and grazing management; hay and silage production. Prerequisite: ACS 211.

ACS 332. **Seed Technology.**
5 hours fall. 2 ① 3 ②
Identification of agriculturally important crop and weed seeds. Measuring quality by checking viability, vigor, physiological development, storability, and contaminants. Prerequisite: ACS 211; Bot 201,202.

ACS 401. **Research.**
ACS 403. **Thesis.**
ACS 405. **Reading and Conference.**
Terms and hours to be arranged.

ACS 407. **Seminar.**
1 hour each term. 1 ①

ACS 410. **Plant Genetics.** (G)
3 hours winter. 3 ①
Theories and principles; polyploidy; qualitative and quantitative inheritance.

ACS 411. **Seed Crop Inspection.** (G)
3 hours spring. 3 ①
Procedures and techniques involved in providing superior quality seed through seed certification with particular attention to maintenance of genetic and mechanical quality of seeds during growth, harvesting, cleaning, processing, and shipping. Prerequisite: ACS 211.

ACS 414. **Seed Production.** (G)
4 hours spring. 3 ① 1 ②
Production, management, and utilization of seed crops; certification, marketing, and legislation. Prerequisite: ACS 211; senior standing.

ACS 415. **Plant Breeding.** (G)
4 hours spring. 3 ① 1 ②
An introduction with emphasis on genetic and cytological principles used in plant improvement. Prerequisite: ACS 410 or equivalent.

ACS 418. **Weed Control.** (g)
5 hours fall. 4 ① 1 ②
Principles of weed control by cultural, biological, and chemical means; weed identification, introduction to herbicides and factors influencing their use. Prerequisite: one year of biological science; one course in organic chemistry.

ACS 419. **Industrial Crops.** (g)
3 hours winter. 3 ①
Production; emphasis on adaptation, agronomic practices, and special qualities. Prerequisite: ACS 322.

Graduate Courses
See also courses marked (g) and (G) above.

ACS 501. **Research.**
ACS 503. **Thesis.**
ACS 505. **Reading and Conference.**
Terms and hours to be arranged.

ACS 507. **Seminar.**
1 hour each term. 1 ①

ACS 511. **Advanced Crop Production.**
3 hours winter. 3 ①
Crop growth, production, and management in relation to environmental and physiological factors and their interrelationships; current literature. Prerequisite: plant ecology and plant physiology courses.

ACS 515. **Plant Breeding.**
3 hours spring. 3 ①
Genetic and cytogenetic principles, methodologies, and theories in improvement of cereal and forage crops. Current literature. Prerequisite: Bi 341; ACS 410 or equivalent.

ACS 516. **Field-Plot Technique.**
5 hours winter. 4 ① 1 ②
Experimental procedures, methods, and techniques; application to field-crop research; interpretation of results.

ACS 518. **Herbicide Science.**
4 hours winter. 4 ①
Classification and structures of herbicides; physiological effects; mode of action; factors influencing herbicide performance. Prerequisite: ACS 418; Bot 331.

ACS 519. **Crop Seed Physiology.**
5 hours winter. 3 ① 2 ②
Metabolic changes and affecting factors during seed development, storage, and germination. Prerequisite: Bot 331,431; Ch 252.

ACS 520. **Conservation Cropping.**
2 hours fall. 2 ①
Crops and cropping systems which replenish and maintain soil organic matter and provide maximum protection against soil losses; plants for dike and streambank protection, sodded waterways, slope maintenance. Prerequisite: ACS 211 and senior standing.

ACS 521. **Concepts of Crop Science.**
3 hours spring. 3 ①
History and current literature.

ACS 528. **Advanced Weed Control.**
3 hours spring. 3 ①
Principles and methods. Industries, institutions, organizations, and regulatory agencies dealing with weed control products and measures. Relationship of weed control to agricultural production, labor utilization, and industrial functions. Prerequisite: ACS 518.

ANIMAL SCIENCE

Programs in Animal Science provide up-to-date information on methods of rearing domestic livestock and of producing meat, milk, wool, fur, and other animal products. Essential to this information is knowledge generated in genetics, nutrition, and physiology. Study in these areas provides the core around which various curricula can be developed.

Recognizing that animal agriculture today includes a number of services and involves many different people, the Department offers options in which emphasis is placed on production and management methods or on the business or scientific aspects of the animal industries. Faculty advise and assist students in selecting appropriate options and in the development of programs of study.

Increasing demands for livestock products by a rapidly expanding human population mean potential employment for well-trained individuals in such areas as farm, ranch, feedlot operation; meat, milk processing work; meat grading with the USDA; Federal Cooperative Extension Service—county and 4-H work; sales or technical employment with commercial feed, seed, and chemical companies and pharmaceutical houses; agricultural loan offices in banks and credit agencies; and the Peace Corps.

The Rangeland Resources program, described elsewhere, is affiliated with the Department and offers integrated training in livestock and range plant management. Students are encouraged to elect courses from other departments throughout the University.

Animal Production/Management Option

This option gives students background for making decisions in the production and management of livestock enterprises. It combines thorough grounding in the sciences with basic business principles to provide the basis for improvement of animal production.

Graduate students may pursue research projects through the Agricultural Experiment Station as part of their programs for M.S. or Ph.D. degrees. Graduate majors are offered in animal genetics, animal nutrition, animal physiology, and rangeland resource management.

Science Option

For students preparing for professional careers in animal science teaching and research, this option provides the training in the biological and physical sciences necessary for understanding the basic mechanisms involved in animal functions. College of Science courses provide the foundation; Animal Science courses develop skills in applying fundamental principles.

Business Option

For students desiring an understanding of business principles and their application to the complex business of livestock production and allied enterprises. The core courses include 30-35 term hours in economics, accounting, finance, marketing, statistics, business and real estate law, investments, and salesmanship. The program of study will be based on the student's previous experience and interests. A minor in business administration may be obtained if desired.

Production Option

Stressing basic principles of animal breeding, feeding, management, and marketing of farm animals and their products, this option may be varied between general and specialized training to meet the student's needs and desires. Well-equipped laboratories and small animal facilities supplement purebred herds and flocks of dairy and beef cattle, sheep, swine, horses, and mink used to demonstrate the principles of livestock production.

COURSES REQUIRED IN ALL OPTIONS

Animal Science
Ans 121 Animal Science
AnS 278 Principles of Animal Breeding
AnS 311 Animal Nutrition
AnS 316 Reproduction of Domestic Animals
AnS 407 Seminar
Two or three production courses (from AnS 421, 422,423,424)

Other Agriculture
ACS 211 Crop Production or Sls 210 Soils

Communications, 18 hours including:
Wr 121 English Composition
Sp 111 Fundamentals of Speech

Health Education
H 160 Personal Health

Liberal Arts, 18 hours

Physical Education
Three terms of activity courses

ADDITIONAL COURSES IN THE ANIMAL PRODUCTION/MANAGEMENT OPTION

Agriculture
AEc 211 Agriculture Business Management
Rng 341 Range Resources or ACS 324 Pasture Production

Business Administration
BA 211 Financial Accounting
BA 315 Business Law

Liberal Arts
Ec 213,214 Principles of Economics

Science
Ch 104,105,106 General Chemistry
Ch 226 Organic Chemistry
Ent 311 Applied Entomology
Mth 161 Mth for Biol, Mgmt, and Social Sci
GS 101,102,103 Gen Biology and VM 320, 321 Anat and Physiol of Dom Animals, or Z 201,202,203 Gen Zoo and Bot 201 and 202 or 203 Gen Botany
Mb 130 Intro to Microbiology or Mb 304 Gen Microbiology

ADDITIONAL COURSES IN THE BUSINESS OPTION

Agriculture
AEc 211 Agriculture Business Management

Business Administration
BA 211 Financial Accounting
BA 212 Managerial Accounting
BA 315 Business Law

Liberal Arts
Ec 213,214 Principles of Economics

Science
Ch 104,105,106 General Chemistry
GS 101,102,103 General Biology
or Z 201,202 Gen Zoo and Bot 201 and 202 or 203 Gen Botany
Mth 161,162,163 Math for Biol, Mgmt, and Social Sci
St 311,312 Intro to Statistics or BA 235 Quant Business Methods
Mb 130 Introduction to Microbiology

ADDITIONAL COURSES IN THE SCIENCE OPTION

Agriculture
VM 320,321 Anatomy and Physiol of Dom Animals or Z 431,432 Physiology

Science
Ch 201,202,203,207 Gen Chemistry
Ch 226,227,228 Organic Chemistry
Z 201,202,203 Gen Zoo and Bot 201 and 202 or 203 Gen Botany and Mb 304 Gen Microbiology
or Bi 211,212,213 Biology and Bi 360 Cell Physiology
Mth 161,162,163 Math for Biol, Mgmt, and Social Sci
St 311,312 Intro to Statistics

Lower Division Courses

AnS 121. **Animal Science.**
3 hours any term. 3 ①
Principles of modern livestock production.

AnS 122. **Animal Science Laboratory.**
2 hours fall or spring. 2 ②
Prerequisite: AnS 121 prerequisite or parallel.

AnS 199. **Special Studies.**
Terms and hours to be arranged.

AnS 221. **Horse Husbandry.**
3 hours fall or spring. 2 ① 1 ②
Feeding, care, and management of light horses. PULSE.

AnS 231. **Livestock Evaluation.**
2 hours winter. 2 ③
Visual appraisal of market and breeding classes of beef cattle, sheep, and swine. Live animal and carcass comparisons. Prerequisite: AnS 121.

AnS 278. **Principles of Animal Breeding.**
4 hours fall or spring. 3 ① 1 ②
Application of Mendelian inheritance to livestock improvement.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

AnS 311. **Animal Nutrition.**
3 hours any term. 3 ①
Comparative nutrient metabolism and digestive physiology; consequences of nutritional deficiencies. Prerequisite: Ch 106; Ch 226 concurrently recommended. CHEEKE, OLDFIELD.

AnS 313. **Ration Formulation and Feed Processing.**
4 hours winter. 3 ① 1 ①
Nutritional implications of feed processing and storage; formulating rations for specific animal requirements including application of computer techniques. Prerequisite: AnS 311. RALSTON.

AnS 316. **Reproduction in Domestic Animals.**
3 hours winter. 3 ①
Male and female reproductive systems; fertility complex and factors affecting it. Prerequisite: Z 202 or GS 103. WU.

AnS 317. **Reproduction in Domestic Animals Laboratory.**
1 hour winter. 1 ③
To accompany AnS 316.

AnS 320. **Evaluation of Dairy Cattle.**
2 hours spring. 2 ②
The phenotypic and genotypic evaluation of dairy cattle including judging, classification, and performance records. GASHLER.

AnS 327. **Artificial Insemination.**
3 hours spring. 1 ① 2 ②
Principles and practice of artificial insemination of domestic animals. Prerequisite: AnS 316. Consent of instructor required. WU.

AnS 351. **Meats.**
3 hours fall or spring. 1 ① 2 ②
Slaughter, cutting, packing house and retail markets, sanitation, and inspection of meat. Prerequisite: junior standing. KENNICK.

AnS 352. **Wholesale and Retail Meat.**
3 hours winter. 2 ① 1 ②
Operations and economics of the wholesale and retail meat industry. Prerequisite: AnS 351. KENNICK.

AnS 401. **Research.**
Terms and hours to be arranged.

AnS 405. **Reading and Conference.**
Terms and hours to be arranged.

AnS 407. **Seminar.**
1 hour fall, winter, or spring. 1 ②
OLDFIELD.

AnS 411. **Ruminant Nutrition.** (G)
3 hours fall. 3 ①
Practical nutrition of ruminant animals. Prerequisite: AnS 311; Ch 226; AnS 313 recommended. CHURCH.

AnS 413. **Comparative Nutrition.** (G)
3 hours winter. 3 ①
Comparative nutrient requirements of domestic animals and factors modifying these requirements with emphasis upon similarities and differences among the various species. Prerequisite: AnS 311; Ch 227; physiology. CHEEKE.

AnS 421. **Dairy Production.** (g)
4 hours fall. 3 ① 2 ②
Nutrition, breeding, reproduction, and management of dairy cattle. Prerequisite: AnS 278,311,316. SWANSON.

AnS 422. **Sheep Production.** (g)
4 hours winter. 2 ① 2 ②
Nutrition, breeding, reproduction, and management of sheep. Prerequisite: AnS 278,311, 316. HOHENBOKEN.

AnS 423. **Swine Production.** (g)
4 hours winter. 2 ① 2 ②
Nutrition, breeding, reproduction, and management of swine. Prerequisite: AnS 278,311. ENGLAND.

AnS 424. **Beef Production.** (g)
4 hours spring. 2 ① 2 ②
Nutrition, breeding, reproduction, and management of beef cattle. Prerequisite: AnS 278,313 or 411. RALSTON.

AnS 432. **Physiology of Lactation.** (G)
3 hours spring. 3 ①
Physiological and environmental factors affecting mammary gland development and function. Prerequisite: VM 320; Ch 227; or equivalent. Offered alternate years. Offered 1974-75. STORMSHAK.

AnS 478. **Animal Improvement.** (G)
4 hours fall. 4 ①
Genetics, breeding systems, and selection principles.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

AnS 501. **Research.**
Terms and hours to be arranged.

AnS 503. **Thesis.**
Terms and hours to be arranged.

AnS 505. **Reading and Conference.**
Terms and hours to be arranged.

AnS 507. **Seminar.**
Terms and hours to be arranged.

AnS 550,551,552. **Topics in Animal Nutrition.**
3 hours each term. 3 ①
Recent advances. Different topic each term. Prerequisite: AnS 411 or AnS 413. CHEEKE, CHURCH, RALSTON.

AnS 570,571. **Topics in Animal Breeding.**
3 hours each term. 3 ①
Nonsequence courses designed to acquaint student with recent advances in animal breeding. Different topic each quarter. Prerequisite: AnS 478 or equivalent. ENGLAND, HOHENBOKEN.

AnS 573. **Physiology of Reproduction in Domestic Animals.**
4 hours spring. 4 ①
Anatomy and physiology of reproductive organs; role of neuroendocrine systems, hormones, and environmental factors in reproductive processes. Offered alternate years. Not offered 1974-75. STORMSHAK.

AnS 574. **Growth in Domestic Animals.**
3 hours fall. 3 ①
Endocrines and growth; bioenergetics and differentiation; genetic, bacterial, and nutritional aspects. Prerequisite: Ch 452; Z 533; AnS 411, 578. Offered alternate years. Not offered 1974-75.

AnS 578. **Livestock Genetics.**
4 hours spring. 4 ①
Inheritance of anatomical and physiological abnormalities; genetic significance of breeding methods; genetic physiological interrelations. Prerequisite: St 452; P 442. HOHENBOKEN.

EXTENSION METHODS

See SCHOOL OF EDUCATION

FISHERIES AND WILDLIFE

This department prepares students for professional careers in wildlife and in fisheries as biologists, managers, and administrators with State and Federal agencies, land and water-using industries, and public health organizations. The department offers work leading to the B.S., M.S., and Ph.D. degrees.

After the freshman year the student may elect one of these majors: (1) Fisheries Science or (2) Wildlife Science.

The wildlife major emphasizes the ecological requirements of wild birds and mammals in relation to multiple-use principles of land and water management. It also orients the student for graduate study and research.

The fisheries science major is designed for students planning to enter graduate study or the research and management fields of commercial and game fisheries.

Students planning to transfer to one of these curricula should try to obtain courses in general zoology, general botany or biology, wildlife conservation, general chemistry, physics, or mathematics during their freshman and sophomore years.

Strategically located for the study of fisheries and wildlife, Oregon State University has within easy access state fish hatcheries, a game farm, refuges, experimental stream and ponds, and the Marine Science Center at Newport. Research by the State Game Commission and Cooperative Wildlife and Fishery research units is of basic value to the instructional programs.

Graduate programs leading to the M.S. or Ph.D. permit intensive study in special areas of interest under the guidance of

nationally known scientists. Advanced study in Fisheries Science may be pursued in water pollution biology, aquiculture, ecology of marine and freshwater fishes, taxonomy and systematics, genetics, parasites, and diseases. Advanced study in Wildlife Science is resource-management oriented and can involve almost any bird or mammal species presenting management problems in the Northwest. Research emphasis may be placed on population dynamics and utilization, life history and ecology, population control, food habits and nutrition, and behavior. Opportunities exist for work with both terrestrial and marine species.

COURSES REQUIRED IN MAJORS

	Hours
Courses common to both curricula	
Orientation to Fisheries and Wildlife (Wld 107)	1
Wildlife Seminar (2 terms) (Fsh or Wld 407)	2
Principles of Wildlife Conservation (Wld 251)	3
Economic Ichthyology (Fsh 313)	5
Fishery Biology (Fsh 454)	5
English Composition (Wr 121)	3
Informative Speaking (Sp 112)	3
Other communications courses	12
Outlines of Economics (Ec 115)	4
Other humanities and social sciences	14
General Chemistry (Ch 201,202,203)	9
Organic Chemistry (Ch 226)	3
Biology (Bi 211,212,213)	15
General Physics (Ph 201,202)	8
Mathematics (Mth 60,110,111)	12
Introduction to Statistics (St 311,312)	6
Physical education activity (3 terms)	3
Personal Health (H 160)	2
Courses required in each curriculum	
Wildlife Science	
Wildlife Resources: Mammals (Wld 310)	5
Wildlife Resources: Birds (Wld 311)	5
Wildlife Ecology (Wld 481)	5
Anatomy and Physiology of Domestic Animals (VM 320,321)	8
Soils (Sls 210)	5
General Ecology (Bi 370,371)	5
Systematic Botany (Bot 321)	4
Electives	45
Fisheries Science	
Organic Chemistry (Ch 227)	3
Economic Ichthyology (Fsh 314)	4
Commercial Fisheries (Fsh 465)	5
Electives to be selected from approved list	13
Physiology electives from approved list	7
Environmental Engineering Fundamentals (CE 414)	3
Electives	42

Lower Division Courses

Wld 107. Orientation to Fisheries and Wildlife.
1 hour. 1 ①
Information relevant to academic pathways and career planning in the fields of fisheries and wildlife. Graded on P-N basis.

Fsh or Wld 199. Special Studies.
Terms and hours to be arranged.

Wld 251. Principles of Wildlife Conservation. 3 hours any term. 3 ①
History of conservation and natural resource use; man's relationship to his natural environment; soil, plant, animal relationships; principles and practices of fisheries and wildlife management and the role of research in management of wildlife. LONG, KUHN, VERTS, JARVIS.

Wld 261. Wildlife Recreational Techniques.
3 hours fall or spring. 3 ① 1 ②
Equipment and techniques used by sportsmen and biologists in harvest, field care, and utilization of the fish and game crops. LONG.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Wld 310. Wildlife Resources: Mammals. 5 hours 3 ① 1 ④
Identification, life history, environmental relationships, management principles of mammals, with emphasis on economically important groups. For fisheries and wildlife majors only. Prerequisite: Wld 251; Bi 213 or Z 203. Fisheries and Wildlife majors only. VERTS.

Wld 311. Wildlife Resources: Birds.
5 hours. 3 ① 1 ④
Identification, structure, life histories, ecology, management principles and techniques. Upland game birds, waterfowl, marsh birds, raptors, song birds, and pest species. Prerequisite: Bi 213 or Z 203. For fisheries and wildlife majors only. JARVIS.

Fsh 313. Economic Ichthyology.
5 hours. 3 ① 2 ②
Identification, anatomy, life history of economically important fishes of Oregon and the Pacific Northwest; the relationship of these fishes to the world fish fauna. Prerequisite: sophomore standing. JUNTUNEN.

Fsh 314. Economic Ichthyology.
4 hours. 3 ① 1 ②
Classification, distribution, and uses of orders and families of fishes having economic or other significance. Prerequisite: Fsh 313. JUNTUNEN.

Fsh 315. Aquaculture.
3 hours. 3 ①
Culture of aquatic organisms from a worldwide standpoint. Theories and methods of production of fish and invertebrates. Prerequisite: Fsh 313.

Fsh or Wld 341. Wildlife Law Enforcement. 3 hours winter. 2 ① 1 ②
State and Federal fish and game laws and regulations and the scientific methods used to collect, preserve, and present evidence in the enforcement of these laws and regulations. Prerequisite. Wld 251 or two years of biology. KUHN.

Fsh or Wld 401. Research.

Fsh or Wld 405. Reading and Conference.

Fsh or Wld 407. Seminar.
Terms and hours to be arranged.

Wld 420. Vertebrate Pest Control. (G)
4 hours winter. 3 ① 1 ②
Techniques, methods, and procedures used to control vertebrate pests including fish, furbearing animals, birds, and rodents where they become nuisance animals or important in transmitting disease, damaging property, or destroying agricultural or forest crops. Prerequisite: senior standing. KUHN.

Wld 451. Biology of Game Birds. (G)
5 hours. 3 ① 2 ②
Identification, distribution, life histories, and ecology of game birds. Prerequisite: Wld 311. LONG.

Fsh 454. Fishery Biology. (G)
5 hours. 3 ① 1 ① 1 ③
Principles, theories, and methods used in studying the biology of fishes; historic and contemporary fish culture practices; and environmental modifications affecting fish production. Prerequisite: Fsh 313; junior standing. MCINTYRE.

Z 454. Principles of Symbiosis. (G)
4 hours. 2 ① 2 ②
For course description see Zoology.

Fsh 455. Fish Culture. (G)
3 hours winter. 3 ①
The use of hatcheries and ponds to produce fish for sport and other purposes; environmental and genetic modifications affecting fish production and management. Prerequisite: two years of biology. DONALDSON.

Fsh 456. Fishery Limnology. (G)
3 hours spring. 3 ①
Limnological concepts and techniques related to fishery research and management. Prerequisite: senior standing. DAVIS.

Fsh 457. Fishery Limnology Laboratory. (G) 2 hours. 1 ① 1 ④
Methods, techniques of limnological investigation. Prerequisite or corequisite: Fsh 456.

Wld 458. Management of Big Game Animals. (G)
3 hours. 2 ① 1 ②
Practices and procedures including census, food habits, damage controls, limiting factors. Prerequisite: Wld 310. VOHS.

Wld 459. Wildlife Field Trip. (G)
2 hours. (6 days)
Field trip to specific areas of interest with emphasis on big game, upland game, and waterfowl. Integration of classroom knowledge with survey of big game ranges, problems in multiple agency control of public lands, practices of manipulations of winter ranges, public relations and management of consuming and producing publics, appraisal of management practices of public agencies. Prerequisite: Wld 310,311.

Fsh 465. Commercial Fisheries. (G)
5 hours. 2 ② 1 ②
Classical commercial fishery management techniques, international problems, two-day field trip. Prerequisite: Fsh 313. HORTON.

Fsh 466. Invertebrate Fisheries. (G)
4 hours. 2 ① 2 ②
Economic invertebrates, life histories, harvesting, values, management problems and procedures. Prerequisite: Fsh 313. HORTON.

Fsh 470. Water Pollution Biology. (G)
3 hours winter. 2 ① 1 ③
Application of biological principles to the solution of water pollution problems taking into account both engineering and economic considerations. Prerequisite: senior standing. SHUMWAY.

Wld 481. Wildlife Ecology.
5 hours. 3 ②
Interrelationships of wildlife, environment, and man. Evaluations of properties and habitats of wildlife populations. Prerequisite: Bi 371. VOHS, JARVIS.

Fsh 490. Parasites and Diseases of Fish. (G) 5 hours. 3 ① 2 ②
Identification, life history, pathology, diagnosis, treatment, control, and economic importance of pathogenic microorganisms and animal parasites of fish. Prerequisite: two years of biology. MILLEMANN.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

Fsh or Wld 501. Research.

Fsh or Wld 503. Thesis.

Fsh or Wld 505. Reading and Conference.

Fsh or Wld 507. Seminar.
Terms and hours to be arranged.

Fsh 555. **Fish Genetics.**
3 hours. 3 ①
Examples from population genetics through molecular genetics with emphasis on fish evolution applied to problems of speciation and race formation, hatchery biology, fish taxonomy, and management of natural populations. Prerequisite: Bi 341.

Wld 561. **Wildlife Investigational Techniques.** 4 hours. 3 ②
Principles, problems, and practices involved in conducting wildlife research. Evaluation of usefulness and limitations of available techniques for solving specific problems. Prerequisite: graduate standing; one year of upper division biological science. VERTS.

Fsh or Wld 567,568. **Research Perspectives.**
4 hours each term. 4 ①
Wld 567: Difficulties in ecological thought; physiological and bioenergetic perspectives in ecology. *Wld 568:* Behavioral, population, and community perspectives in ecology. WARREN.

Fsh or Wld 569. **Population Dynamics.**
4 hours. 4 ①
Dynamics and exploitation of fish and wildlife populations. HALL.

Fsh 570. **Pollution Problems in Fisheries.** 3 hours. 2 ① 1 ②
Polluted waters as they affect fisheries; sources, measures, biological indices, and abatement of water pollution; water requirement and toxicology of fishes and associated aquatic organisms. Prerequisite: Fsh 470. DOUDOROFF.

Fsh 571. **Functional Ichthyology.**
3 hours fall. 2 ① 1 ③
Physiological aspects of the biology of fishes; reactions to, and tolerances of, environmental stresses. Prerequisite: two years of upper division fisheries or zoology. WEBER.

Fsh 572. **Systematics of Fishes.**
3 hours winter. 2 ① 1 ③
Phylogeny and evolution of fishes; systematic arrangement with emphasis on economically important forms. Prerequisite: two years of upper division fisheries or zoology. BOND.

Fsh 573. **Special Topics in Ichthyology.**
3 hours spring. 2 ① 1 ③
Distribution, ecology, and other current topics. Prerequisite: two years of upper division fisheries or zoology. BOND.

FOOD SCIENCE AND TECHNOLOGY

Food Science and Technology is the application of the sciences and engineering to the manufacture, preservation, storage, transportation, and consumer use of food products.

Processing of the basic raw materials—milk, fruits, vegetables, seafoods, meats, and grains—into consumer products by canning, freezing, dehydrating, fermenting, and fabrication is taught with emphasis on basic chemical, microbiological, and physical principles rather than on specific procedures. Because of this, those who complete a major in this department have excellent opportunities in or associated with the largest industry in the world—the food industry. These opportunities include research and development in industry, government, colleges, and universities; regulation of food quality through government agencies and within companies; and management or operation of food products manufacturing plants.

The undergraduate four-year program leads to the *B.S. degree in Food Science and Technology.* Students wishing to study a specific phase of foods should enroll for a fifth year leading to the M.S. degree.

Students wishing a Master of Business Administration (M.B.A.) degree, to provide special qualifications for employment in food company management, should take certain additional courses in business during the undergraduate years, then enroll for a fifth year in the School of Business and Technology.

Graduate programs leading to the *M.S. or Ph.D. degrees in Food Science* permit intensified study in the subject areas of special interest. The food science program is concerned with basic science and research involving the chemical, physical, and biological aspects of foods; it usually relates to the processing, preservation, distribution, and utilization of foods.

Departmental facilities include well-equipped laboratories and pilot plants for instruction and research, the Seafoods Laboratory at Astoria, and the Toxicology and Nutrition Laboratory near Corvallis.

RECOMMENDED CURRICULUM

Freshman Year[1]

	Hours
General Chemistry (Ch 204,205,206)	15
Analytic Geometry, Calculus (Mth 110,111, 112)	12
Biological science or electives (see adviser)	12
Food Science Colloquium (FST 113)	1
Food and Man (FST 112)	3
English Composition (Wr 121)	3
Personal Health (H 160)	2

Sophomore Year

Organic Chemistry (Ch 226,227,228,229)	10
Quantitative Analysis (Ch 234)	4
Food Processing (FST 221,222,223)	13
Statistics (St 311,312 or 451,452)	6–8
Speech Communication (Sp 111)	3
English Composition (Wr 222)	3
Technical Report Writing (Wr 327)	3
Communication elective	3
Physical education	3

Junior Year

General Physics (Ph 201,202)	8
Principles of Economics (Ec 213,214)	8
Biochemistry (BB 350 or 450,451)	4–7
Animal Nutrition (AnS 311)	3
Food Science (FST 411,412,413)	12
Quality Control Systems (FST 424)	3
General Microbiology (Mb 304)	5
[2]Electives and/or Food Packaging (FST 431)	9

Senior Year

Food Engineering (AE 441,442,443)	10
Microbial Contamination, Dairy or Food Micro (Mb 440,442, or 444)	8
Seminar (FST 407)	2
Food Analysis (FST 423)	5
Federal and State Food Regulations (FST 421)	2
Communication elective	3
Humanities and/or social science electives	10
[2]Electives	9

[1] Students interested in ROTC must consult with their advisers.

[2] If fifth year is planned for a Master of Business Administration or a Master of Science degree, see adviser for list of elective courses.

Lower Division Courses

FST 112. **Food and Man.**
3 hours. 3 ①
For majors and nonmajors. An interdisciplinary course relating man's social, economic, and political development to food and the development of food technology. Subject matter from disciplines of food science and technology, nutrition, anthropology, history, political science, economics, and marketing.

FST 113. **Food Science Colloquium.**
1 hour fall. 1 ①
For food science majors. Informal discussions of current problems in food science and technology that have social, economic, and political implications.

FST 199. **Special Studies.**
Terms and hours to be arranged.

FST 201. **Food Technology.**
5 hours fall. 4 ① 1 ③
For nonmajors. Food and man; food acceptance, quality, raw material, preservation, processing, packaging materials.

FST 202. **Food Quality.**
4 hours winter. 2 ① 2 ③
For nonmajors. Quality of fruits, vegetables, cereals, meats, seafoods, milk, milk products; governmental quality standards and food law; quality control.

FST 221. **Food Processing.**
4 hours fall. 2 ① 1 ③
Fruit and vegetable processing with related unit operations and unit processes; standards and quality grading; detection and identification of extraneous materials in food. For food science majors.

FST 222. **Food Processing.**
4 hours winter. 3 ① 1 ③
Cereal foods, confections, beverages, meats, and seafood processing with related unit operations and unit processes; food plant sanitation and waste disposal. For food science majors.

FST 223. **Food Processing.**
5 hours spring. 3 ① 2 ③
Processing milk and milk products with related unit operations and unit processes. For food science majors.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (G) may be taken for graduate credit.

FST 350. **Elementary Food Science.**
4 hours spring. 3 ① 1 ③
For nonmajors. Food composition and additives concerning color, odor, taste, texture, nutrients, and toxicants; food poisoning. Prerequisite: 9 hours of general chemistry; FST 201; FN 225; Mb 130.

FST 401. **Research.**

FST 403. **Thesis.**

FST 405. **Reading and Conference.**
Terms and hours to be arranged.

FST 407. **Seminar.**
1 hour each term. 1 ①

FST 411,412,413. **Food Science.** (*g*)
4 hours each term. 3 ① 1 ③
The role chemical, physical, and biological properties of foods, additives, and processing have on color, odor, taste, texture, nutrients, and toxicants. *411:* Food composition and food additives; *412:* fats, oils, grain foods, confections, beverages, fruits, and vegetables; *413:* Meat, meat products, poultry, seafood, and soy products; nutritive values. Prerequisite: FST 221,222,223; Mb 304; BB 450, 451.

FST 421. **Federal and State Food Regulations.** (g)
2 hours winter. 2 ①
Laws and regulations dealing with the manufacture of foods; labeling, adulteration, misbranding, food standards, case problems. Prerequisite: senior standing.

FST 423. **Food Analysis.** (g)
5 hours winter. 3 ① 2 ③
Chemical and physical analysis. Prerequisite: FST 411,412; Ch 234; BB 450,451.

FST 424. **Quality Control Systems.** (G)
3 hours fall. 2 ① 1 ③
Principles, organization, sampling plans, and statistical applications in food processing plants. Prerequisite: FST 221; St 312 or 451.

FST 431. **Food Packaging.** (G)
3 hours winter. 2 ① 1 ②
Objectives and requirements of packaging; composition, characteristics, chemical and physical properties, selection and adaptation of packaging materials and packages. Prerequisite: FST 221,223,411; Ch 226.

FST 451. **Current Topics in Food Science.** (G)
3 hours spring. 3 ①
Recent advances in food science and technology and their application to special fields of study. Consult department for topics which vary from year to year. Prerequisite: FST 412; Mb 304; BB 451.

AET 441,442,443. **Food Engineering.**
See Department of Agricultural Engineering Technology.

Mb 440. **Microbial Contamination Control.**

Mb 442. **Dairy Microbiology.**

Mb 444. **Food Microbiology.**
See Department of Microbiology.

Graduate Courses
See also courses marked (g) and (G) above.

FST 501. **Research.**

FST 503. **Thesis.**

FST 505. **Reading and Conference.**
Terms and hours to be arranged.

FST 507. **Seminar.**
1 hour each term. 1 ①

FST 531. **Carbohydrates in Foods.**
3 hours spring. 2 ① 1 ②
Chemical and physical properties; changes during processing and storage. Prerequisite: Ch 228; BB 451 or 491. Offered alternate years. Not offered 1974-75.

FST 532. **Food Flavors and Evaluation.** 3 hours winter. 2 ① 1 ③
Chemical definition; flavor development, preservation, and deterioration; subjective methods for evaluation. Prerequisite: Ch 498; St 312 or 451. Offered alternate years. Not offered 1974-75.

FST 533. **Lipids in Foods.**
3 hours fall. 2 ① 1 ③
Function, composition, preservation, deterioration, and analysis. Prerequisite: Ch 428; BB 451 or 491. Offered alternate years. Not offered 1974-75.

FST 561. **Pigments and Color Evaluation.**
3 hours fall. 2 ① 1 ③
Detection and measurement of food pigments and synthetic food colors; effects of food processing; color perception and evaluation. Prerequisite: BB 451 or 491. Offered alternate years. Offered 1974-75.

FST 562. **Proteins in Foods.** 3 hours winter. 2 ① 1 ③
Food protein systems; reactions with other food components; changes in proteins and how they affect the chemical and physical properties of foods. Prerequisite: Ch 428; BB 451 or 491. Offered alternate years. Offered 1974-75.

FST 563. **Enzymes of Foods.**
3 hours spring. 2 ① 1 ③
Effect of processing methods on enzymes of foods; use of enzymes in food processing. Prerequisite: Ch 428; BB 451 or 491. Offered alternate years. Offered 1974-75.

HORTICULTURE

The field of horticulture relates to the production, marketing, and distribution of fruits, nuts, vegetables, ornamentals, and floricultural crops, and to the laying out, planting, care and maintenance of parks, playground areas, highways, and commercial and home landscape plantings and sites.

The Department of Horticulture offers the four options listed below leading to the B.S. degree. Through the Graduate School it also offers programs leading to the M.S. and Ph.D. degrees.

SCIENCE OPTION

For students wishing to pursue graduate studies and professional careers in teaching and research.

Freshman Year	Hours
English Composition (Wr 121)	3
Approved economics	4
Social science	3
General Chemistry (Ch 201,202,203,207)	11
Calculus (Mth 111)	4
General Botany (Bot 201,202,203)	12
Approved communications	3
Approved science electives	4
Physical education and personal health	3
Sophomore Year	
Basic Horticulture (Hort 215,216)	6
Soils (Sls 210)	5
Organic Chemistry (Ch 226,227)	6
General Physics (Ph 201,202,203)	12
Approved science electives	4
Approved agriculture electives	3
Approved communications	6
Approved hum and soc sci electives	3
Physical education and personal health	2
Junior Year	
Plant Genetics (ACS 410)	3
Applied Entomology (Ent 311)	4
Plant Physiology (Bot 331)	5
Agricultural Marketing (AEc 311)	5
Approved communication electives	3
Approved hum and soc science electives	9
Approved horticulture courses	9
Unrestricted electives	9
Agriculture electives	3
Senior Year	
Plant Pathology (Bot 450)	5
Plant Breeding (ACS 415)	4
Approved horticulture courses	6
Approved hort and agriculture electives	10
Unrestricted electives	9
Communication electives	3
Statistics (St 311,312)	6
Approved science electives	6

TECHNOLOGY OPTION

For students interested primarily in the production aspects of horticulture.

Freshman Year	Hours
English Composition (Wr 121)	3
Outline of Economics (Ec 115)	4
Social science	3
General Chemistry (Ch 201,202,203)	9
Trigonometry (Mth 60)	4
Approved physics	3
General Botany (Bot 201,202,203)	12
Approved communications	6
Physical education and personal health	3
Sophomore Year	
Basic Horticulture (Hort 215,216)	6
Soils (Sls 210)	5
Agricultural Business Mgmt (AEc 211)	5
Organic Chemistry (Ch 226)	3
Approved agriculture and hort electives	9
Approved communications	9
Hum and soc sci electives	3
Approved science electives	6
Physical education and personal health	2
Junior Year	
Applied Entomology (Ent 311)	4
Plant Genetics (ACS 410)	3
Plant Physiology (Bot 331)	5
Agricultural Marketing (AEc 311)	5
Approved agriculture electives	3
Approved hum and soc sci electives	9
Approved horticulture courses	9
Approved science elective	3
Unrestricted electives	9
Senior Year	
Plant Breeding (ACS 415)	4
Plant Pathology (Bot 450)	5
Approved agriculture and hort electives	9
Approved and unrestricted gen electives	24
Approved horticulture courses	6

BUSINESS OPTION

For students who want to gain an understanding of business principles as they pertain to horticultural enterprises, and to prepare for a career in agricultural business.

Freshman Year	Hours
English Composition (Wr 121)	3
Outline of Economics (Ec 213,214)	8
Hum and soc sci electives	3
General Chemistry (Ch 201,202,203)	9
Approved physics	3
Trigonometry (Mth 60)	4
General Botany (Bot 201,202)	8
Approved communications	6
Physical education and personal health	3
Sophomore Year	
Basic Horticulture (Hort 215,216)	6
Soils (Sls 210)	5
Agricultural Business Mgmt (AEc 211)	5
Applied Entomology (Ent 311)	4
Fin Acctng and Man Acctg (BA 211,212)	8
Approved communications	6
Approved agriculture and hort electives	11
Physical education and personal health	2
Junior Year	
Plant Physiology (Bot 331)	5
Organization and Management (BA 302)	4
Production (BA 311)	4
Plant Genetics (ACS 410)	3
Approved agriculture electives	6
Approved horticulture courses	6
Communications electives	3
Unrestricted electives	9
Approved hum and soc sci electives	9
Senior Year	
Agricultural Marketing (AEc 311)	5
Human Relations in Business (BA 361)	4
Plant Breeding (ACS 415)	4
Plant Pathology (Bot 450)	5
Finance (BA 313)	4
Business Law (BA 315)	4
Statistics (St 311,312)	6
Approved horticulture courses	9
Unrestricted electives	9

LANDSCAPE CONSTRUCTION AND MAINTENANCE OPTION

Provides a basis for understanding the functional use of plants in the environment. For students interested in professional careers in design, layout, planting, and maintenance of ornamental plantings and for those with nonprofessional interest in the use of plants to enhance their surroundings.

Freshman Year	Hours
General Chemistry (Ch 104,105,106)	13
General Botany (Bot 201,202,203)	12
Design Studio I (AA 280)	3
Landscape Design Theory (LA 280)	3
English Composition (Wr 121)	3
Intermed Algebra, Trig (Mth 51,60)	8
Elective	3
Physical education and personal health	4

Sophomore Year	
Landscape Design I (LA 290,291)	6
Social science	6
Basic Acctng and Fin Analysis (BA 217)	3
Plane Surveying (CE 226)	3
General Physics (Ph 201)	3
Basic Horticulture (Hort 215,216)	6
Soils (Sls 210)	5
Plant Propagation (Hort 311)	3
Approved communications courses	6
Electives	6
Physical education	2

Junior Year	
Landscape Design II (LA 390,391,392)	9
Maint and Constr (LA 359,360,361)	9
Systematics (LA 326,327,328)	9
Business Law (BA 315)	4
Applied Entomology (Ent 311)	3
Plant Ecology (Bot 341)	3
Lawns and Turfs (ACS 313)	2
Approved electives	4
Unrestricted electives	4

Senior Year	
Plant Composition (LA 426,427,428)	6
Landscape Design III (LA 490,491)	8
Plant Pathology (Bot 450)	5
Nursery Management (Hort 361,362)	8
Social science	3
Land Drainage (AET 319)	3
Approved electives	6
Unrestricted electives	8

A two-year terminal curriculum in nursery management is also available. This curriculum provides instruction and training for those students interested in general nursery management work as nursery foremen, propagators, planting foremen, assistant nursery superintendents, and related positions.

Lower Division Courses

Hort 111. Elements of Horticulture.
3 hours. 2 ① 1 ②
Introduction to field. Propagation, culture, and utilization of fruits, nuts, vegetables, and ornamental plants.

Hort 151. General Floriculture.
3 hours winter. 2 ① 1 ②
Acquaints student with the field, its developments, its branches, and opportunities it offers as a vocation. Offered alternate years. Not offered 1973-74.

Hort 199. Special Studies.
Terms and hours to be arranged.
Provides independent study opportunity for freshmen and sophomores.

Hort 215,216. Basic Horticulture.
3 hours fall and winter. 2 ① 1 ②
Culture of horticultural plants: soil, water, climate in relation to growth, yield, and quality; vegetative propagation and post-harvest physiology.

Hort 253. Flower Arrangement.
3 hours fall or spring. 2 ① 1 ②
Basic principles as applied to florist work.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Hort 311. Plant Propagation.
3 hours winter. 1 ① 2 ②
Propagating or perpetuating plants by means of seeds, cuttings, layers, tubers, bulbs, budding, grafting; practice in greenhouse, nursery, field, and orchard. Not open to freshmen.

Hort 313. Greenhouse Construction and Management.
3 hours spring. 2 ① 1 ②
Planning, layout, construction, and heating of modern greenhouses; factors involved in the efficient operation of a greenhouse range. Offered alternate years. Not offered 1973-74.

Hort 332. Small Fruit Production.
4 hours fall. 3 ① 1 ②
Production, economic and geographic distribution; temperature, water, light, and nutritional requirements and limitations; growth and development; cultural techniques; fruit and fruiting characteristics. Prerequisite: Hort 216. Offered alternate years. Offered 1973-74.

Hort 333. Fruit and Nut Production.
4 hours spring. 3 ① 1 ②
Geographic distribution of deciduous orchards; temperature, water, light, and nutritional requirements and limitations; soil management, pollination, thinning and pruning; native and applied auxins and growth regulators as related to fruit set and growth; influence of rootstocks on tree growth, productivity, and fruit quality; indices of fruit maturity and special problems of production. Prerequisite: Hort 216. Offered alternate years. Not offered 1973-74.

Hort 341. Vegetable Production.
4 hours winter. 3 ① 1 ②
Seeding; plant production; varieties; soil and climatic influences; home vegetable gardens. Basic course for students specializing in vegetable production; adapted to vocational agriculture and extension studies.

Hort 342. Commercial Vegetable Production.
4 hours spring. 3 ① 1 ②
Problems; economic aspects; environmental effects; seed, plant production, irrigation, nutrition, and other aspects of major vegetable crop plants. Offered alternate years. Offered 1973-74.

Hort 351,352,353. Commercial Floriculture.
3 hours each term. 2 ① 1 ②
Cut flowers, pot plants, and forced bulbous crops; modern techniques and recent research findings. Offered alternate years. Offered 1973-74.

Hort 355. Herbaceous Plant Materials.
3 hours spring. 2 ① 1 ②
Annual, biennial, and perennial flowering plants; their use, arrangement, and culture in commercial and home-garden production. Offered alternate years. Offered 1973-74.

Hort 361,362. Nursery Management.
4 hours fall and winter. 3 ① 1 ②
Propagation, planting, culture, digging, packing, and storing of nursery stock; inspection, quarantine regulations; transportation and marketing. Prerequisite: Hort 216. Offered alternate years. Offered 1973-74.

Hort 401. Research.
Terms and hours to be arranged.

Hort 403. Thesis.
Terms and hours to be arranged.

Hort 405. Reading and Conference.
Terms and hours to be arranged.

Hort 407. Seminar.
Terms and hours to be arranged.

Hort 413. Plant Breeding.
4 hours winter. 3 ① 1 ②
(Same as ACS 415.)

Hort 415. Spraying, Dusting, and Fumigation. (G)
3 hours fall. 2 ① 1 ②
Properties and uses of pesticides and related agricultural chemicals in relation to production of horticultural crops; application methods and equipment.

Hort 416. Horticultural Plant Nutrition.
(G) 4 hours winter. 3 ① 1 ②
Factors influencing nutrient absorption and composition of horticultural crops; criteria of essentiality and roles of elements; concepts of nutritional status and nutrient balance; techniques for determining nutritional status; effects of fertility programs on nutritional status. Prerequisite: Hort 216; Bot 331. Offered alternate years. Not offered 1973-74.

Hort 431. Fruit Handling and Distribution. (g)
4 hours winter. 3 ① 1 ②
Problems of fruit handling; harvesting, grading, packing, inspection, storage, transportation, and marketing. Composition and physiology of fruits. Prerequisite: Hort 216.

Hort 433. Systematic Pomology. (G)
4 hours fall. 2 ① 2 ②
Fruit groups, botanical relationships and taxonomy; variety description, nomenclature, identification and classification; variety adaptation and evaluation; origin and improvement of fruit varieties. Offered alternate years. Not offered 1973-74.

Hort 443. Systematic Vegetable Crops. (G)
3 hours fall. 2 ① 1 ②
Nomenclature and classification; nature and importance of horticultural characteristics; varietal differentiation and identification; origins and uses. Offered alternate years. Offered 1973-74.

Hort 451. Flower Shop Operation.
3 hours fall. 2 ① 1 ②
Efficient operation of florist shops; advanced work in design of floral pieces. Restricted to students majoring in floriculture and nursery management. Offered alternate years. Not offered 1973-74.

Hort 453. Handling and Distribution of Florist Crops.
3 hours winter. 2 ① 1 ②
Problems of precooling, packaging, storing, transporting, and distributing florist crops. Offered alternate years. Not offered 1973-74.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

Hort 501. Research.

Hort 503. Thesis.

Hort 505. Reading and Conference.

Hort 507. Seminar.
Terms and hours to be arranged.

Hort 511. Plant Genetics.
4 hours fall. 4 ①
Basic genetic and cytological phenomena as applied to plant breeding. Prerequisite: Bi 341; ACS 415; Hort 413.

Hort 521,522. Horticultural Plant Growth and Development.
4 hours fall and winter. 3 ① 1 ②
Seasonal growth, dormancy, correlative organ development, juvenility, floral initiation, photoperiodic effects, root regeneration, organ maturation, and abscission in horticultural plants; effects of plant growth regulators. Prerequisite: Hort 216; Bot 331; organic chemistry. Offered alternate years. Offered 1974-75.

Hort 531. **Post-Harvest Physiology.**
5 hours spring. 4 ① 1 ②
Post-harvest physiology as it relates to fruits, vegetables, and ornamental crops; influence of pre-harvest conditions on post-harvest behavior; maturation as related to storage behavior; effects of storage atmosphere, temperature, and ethylene on ripening, respiration, and intermediary metabolism; physiological disorders of stored horticultural products. Prerequisite: Hort 522. Offered alternate years. Offered 1974-75.

Hort 541,542,543. **Selected Topics in Horticulture.**
4 hours each term. 4 ①
Breeding and genetics, physiology, environment and nutrition; lectures, current research, literature, review and discussion; offered in the areas of vegetable crops, small fruits, ornamentals, and tree fruits. Prerequisite: Hort 216. Consent of instructor required.

POULTRY SCIENCE

With the rapid development of the poultry industry, a demand exists for persons trained in poultry science. A well trained staff, and adequate physical facilities enable the department to offer excellent educational opportunities to both undergraduate and graduate students. The department has three research plants —two for chickens and one for turkeys— flocks of popular breeds of chickens and turkeys, and various types of buildings and equipment including modern incubators, batteries, and feed mixers, as well as laboratory facilities for instruction and research.

In planning his course of study with his adviser, a student needs to bear in mind that many poultry science courses are taught only in alternate years. He may use elective courses to meet his individual needs and abilities and to emphasize either the technology, science, or business aspects of poultry science.

Graduate study may lead to the M.Agr., M.S., or Ph.D. degree in genetics, management, nutrition, or physiology. Scholarships are available for both undergraduate and graduate students. Additional information may be obtained from the department.

The curriculum below satisfies all the B.S. degree requirements of the School of Agriculture and the University as well as those of the Department of Poultry Science.

Freshman Year	Hours
Poultry Science (P 121)	3
Mathematics depending on placement or aptitude test score	4–6
General chemistry, one year	9–13
Biological science, one year	12
English Composition (Wr 121)	3
Fundamentals of Speech (Sp 111)	3
Journalism (J 111)	3
Physical education (MPE, WPE, or CPE 101-199)	3
General electives	2–8

Sophomore Year	
Techniques and Practices (P 311)	2
Avian Embryo (P 321) or Anatomy and Physiology of the Fowl (VM 311)	3
Organic Chemistry (Ch 226)	3
Communications electives (Wr, J, Sp or Language)	9
Principles of Economics (Ec 213,214)	8
Basic Acctng and Fin Analysis (BA 217)	3
Mathematics (Mth 60 or 161)	4
Personal Health (H 160)	2
General electives	14

Junior Year	Hours
Anatomy and Phys of the Fowl (VM 311) or Avian Embryo (P 321)	3
Poultry Meat Prod (P 421) or Egg Prod (P 422)	4
Poultry Breeding (P 441) or Avian Diseases (VM 451)	3
Genetics (Bi 341 or AnS 278) or Feeds and Feeding (P 411)	3
Physical science electives	6–10
General electives	25–29

Senior Year	
Egg Prod (P 422) or Poultry Meat Prod (P 421)	4
Avian Diseases (VM 451) or Poultry Breeding (P 441)	3
Feeds and Feeding (P 411) or Genetics (Bi 341 or AnS 278)	3
Seminar (P 407)	2
General Electives	36

Lower Division Courses

P 121. **Poultry Science.**
3 hours. 3 ①
Various phases of poultry industry; physiology, reproduction, feeding, housing, brooding, and management practices.

P 199. **Special Studies.**
Terms and hours to be arranged.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

P 311. **Techniques and Practices.**
2 hours. 2 ①
Selection for egg production, meat production. Standard of Perfection. Reasons for, principles behind, and techniques of debeaking, specking, vaccinating, blood testing, artificial insemination, caponizing.

P 321. **Avian Embryo.**
3 hours. 3 ①
Development and environmental requirements of embryos of the domestic fowl. Prerequisite: P 121 or Z 201 or GS 101. Offered alternate years. Offered 1974-75.

P 401. **Research.**

P 403. **Thesis.**

P 405. **Reading and Conference.**

P 406. **Projects.**
Terms and hours to be arranged.

P 407. **Seminar.**
1 hour winter, spring. 1 ①

P 411. **Feeds and Feeding.** (g)
3 hours. 3 ①
Nutritional requirements; formulation of rations; common nutritional deficiencies; feeding practices. Prerequisite: P 121 or GS 101 or Z 201 or Ch 226. Offered alternate years. Not offered 1974-75.

P 413. **Poultry Nutrition.** (G)
3 hours. 3 ①
Proteins, minerals, energy, vitamins, antibiotics, other feed additives in chicken and turkey nutrition. Digestion and metabolism of these substances. Prerequisite: P 411 or AnS 311 or Ch 226.

P 421. **Poultry Meat Production.** (g)
4 hours. 4 ①
Marketing and demand for poultry meat; brooding, rearing, management, economics, housing, equipment of meat and breeder turkeys and of chicken broilers; processing, grading, packing poultry meat. Prerequisite: P 121 or equivalent. Offered alternate years. Not offered 1974-75.

P 422. **Egg Production.** (g)
4 hours. 4 ①
Brooding, rearing, management, feeding of replacement pullets and egg-production stock. Producing, grading, packing, and selling quality eggs and egg products. Prerequisite: P 121 or equivalent. Offered alternate years. Offered 1974-75.

P 441. **Poultry Breeding.** (g)
3 hours. 3 ①
Inheritance of egg and meat production in domestic fowl. Prerequisite: P 121 or GS 101 or Z 201. Offered alternate years. Not offered 1974-75.

P 442. **Population Genetics and Breeding Improvement.** (G)
3 hours. 3 ①
Population genetics and application to selection and mating for improvement of quantitative characters. Prerequisite: Z 341; St 452.

P 451. **Avian Environmental Physiology and Reproduction.** (G)
4 hours. 3 ① 1 ②
Reproductive systems in male and female fowl, reproductive efficiency, factors affecting reproduction. Effects of external environmental factors on the physiology and performance of the fowl, interrelationships of the fowl with the environment, adapting the environment to the fowl. Prerequisite: Bi 213 or VM 311 or equivalent.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

P 501. **Research.**

P 503. **Thesis.**

P 505. **Reading and Conference.**
Terms and hours to be arranged.

P 507. **Seminar.**
1 hour each term. 1 ①

RANGELAND RESOURCES

Rangeland resource management is one of the family of natural resources professions important to the social, economic, and political development of Oregon and the nation. It is concerned with the improvement, conservation, ecology, and use of rangelands. Since range management is practiced on lands producing domestic and wild animals, timber, water, and recreation, concepts of integrated land use are included in the program of training. A good balance among crop, soil, domestic animal, wildlife, and other biological sciences is realized.

The recommended curricula below include university and departmental requirements for the B.S. degree and provide for emphasis either in the science or business aspects of rangeland resources. Facilities available for study and research include greenhouse, field plot, pasture, range, and animal facilities both on campus and at two experiment stations in eastern Oregon. Field trips are taken in conjunction with specific courses.

Graduate work leading to M.Agr., M.S., or Ph.D. degrees may involve do-

mestic or wild animals, range nutrition, range ecology, physiology of range plants, range improvement, range utilization and management, and range resource analysis and monitoring through remote sensing.

Summer employment with private industry, federal and state agencies, and on range research projects makes possible earning while learning. Employment opportunities include resource management, research, extension, range management, college and university teaching, business and industrial activities related to rangeland resources, and foreign agricultural and resource development assistance. See also ANIMAL SCIENCE.

BASIC CURRICULUM REQUIREMENTS

	Science Option (*Hours*)	Business Option (*Hours*)
Agriculture		
Rangeland resources	19	19
Animal science	6	6
Electives in agriculture	19	25
Business	19	31
Communications		
English composition	3	3
Written communication	3	3
Oral communication	3	3
Electives in communication	9	9
Biology and Physical Science		
Botany	25	16
Zoology	6	....
Genetics	3	3
Chemistry (depending on courses selected)	12–16	9–13
Physics	6	3
Mathematics	10–12	12
Statistics	....	6
Physical education	5	5
Humanities and social sciences	9	15
Electives	35–29	24–20
Total term hours	192	192

Lower Division Course

Rng 199. **Special Studies.**
Terms and hours to be arranged.

Upper Division Courses

Courses numbered (*g*) and (*G*) may be taken for graduate credit.

Rng 341. **Rangeland Resources.**
3 hours. 3 ①
Nature and management of rangelands. Integrated land use with emphasis on plant-animal-soil interactions. Prerequisite: sophomore standing.

Rng 342. **Rangeland Improvement.**
3 hours winter. 2 ① 1 ②
Range development, cultural treatments, and management systems used to improve rangelands. Field trip. Prerequisite: Rng 341.

Rng 343. **Range Plant Communities.**
3 hours spring. 2 ① 2 ②
Occurrence, physiology, ecology, and value of important grass, forb, and browse plants on U.S. and Oregon ranges. Field trip. Prerequisite: Bot 321; Rng 341.

Rng 401. **Research.**

Rng 405. **Reading and Conference.**

Rng 406. **Projects.**

Rng 407. **Seminar.**
Terms and hours to be arranged.

Rng 408. **Workshop.**
Terms and hours to be arranged.
Ecological principles and/or management practices as they relate to selected topics in range and related resource management.

Rng 441. **Rangeland Analysis.** (g)
4 hours fall. 3 ① 1 ③
Evaluating rangelands; inventory, forage utilization, range condition, and trend; field problems; use of aerial photographs and sampling theory; field trip. Prerequisite: Rng 341.

Rng 442. **Rangeland-Animal Relations.**
(g) 3 hours winter. 1 ① 2 ②
Domestic and wild animal use of rangelands as related to environmental factors; palatability, food habits, nutrition, physiography, and their effects on management of rangeland animal resources. Prerequisite: Rng 341.

Rng 443. **Range Management Planning.** (G)
3 hours spring. 2 ① 1 ②
Administration and management of rangelands; decision making with actual problems and plan execution; field trip. Prerequisite: senior standing in any natural resources field.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

Rng 501. **Research.**

Rng 503. **Thesis.**

Rng 505. **Reading and Conference.**

Rng 506. **Projects.**
Terms and hours to be arranged.

Rng 507. **Seminar.** 1 hour winter.

Rng 541. **Perspectives in Range Research.**
3 hours winter. 3 ①
Problem analysis approach; integration of plant and animal research. Consent of instructor required. Offered alternate years. Offered 1973-74.

Rng 542. **Rangeland Ecology.**
4 hours spring. 2 ① 2 ②
Application of ecology in rangeland and related resource management; field trip. Prerequisite: systematic botany, Bot 441,442. Offered alternate years. Offered 1973-74.

Rng 543. **Rangeland Management.**
3 hours winter. 1 ① 2 ②
Rangeland-use philosophies on a world-wide basis. Critical evaluation of research papers. Offered alternate years. Not offered 1973-74.

SOIL SCIENCE

Food, fiber, and quality environment concern the soil scientist, Essential to soil science is knowledge in chemistry, physics, biology, and the earth sciences. Soil science is a synthesis of the physical and biological sciences directed towards the study of the nature and properties of soil and its use and conservation in food and fiber production as well as in land use planning.

Majors in soils may choose from three curricula. Those planning to take graduate work leading to research or college teaching or in working in soil surveys should elect the science option. Those preparing for work in chemical industries, other commercial organizations, and farming may wish to elect the business option. The technology option leads to careers in soil conservation planning, extension, land appraisal, field work for industrial and commercial organizations, and farming.

Minimum requirements for students majoring in soils are given below.

Graduate work in soils may lead either to the M.S. or Ph.D. degree or graduate minors for students in other fields. Soil fertility, soil physics, soil chemistry, irrigation, forest soils, plant nutrition, or soil genesis, morphology, and classification may be emphasized in graduate programs.

MINIMUM REQUIREMENTS FOR B.S. DEGREE

	Hours
Agriculture, 45 hours (24 upper division)	
Soil science	25
Approved electives	20
Communications, 18 hours	
Writing or journalism	9
Speech	3
Approved electives	6
Other Humanities and Social Sciences, 18 hours	
Economics	8
Approved electives	10
Science, 62 hours	
Mathematics through Mth 163 (or Mth 111)	(12)
Chemistry through Ch 226 and 234	(18)
Physics through Ph 113 (or Ph 203)	(9)
Botany through Bot 331	(13)
Microbiology	3
Geology	3
Approved electives	(4)
Approved electives	23
Physical education and hygiene	2
Free electives	24
Total term hours	192

NOTE: Credit hour figures in parentheses may vary depending on placement and choice of alternative course sequences. Approved electives are courses approved by the adviser as appropriate for the option selected. Free electives are courses selected by the student.

Lower Division Courses

Sls 100. **Soils and Men.**
3 hours spring. 3 ①
For undergraduates in general science, humanities and social sciences, and other fields to develop a general understanding of the social resource in relation to environmental planning and sound ecological principles of land use. Emphasis on examples and case studies involving soil problems and limitations in land use, pollution control, and ecological aspects of production. Two field trips to be arranged.

Sls 199. **Special Studies.**
Terms and hours to be arranged.

Sls 210. **Soils.**
5 hours fall or winter. 2 ①, 1 ①, 2 ②
Origin, formation, classification; physical, chemical, and biological characteristics; effects of soil management on agricultural and forest crop production. Prerequisite: Ch 203; Mth 51 or equivalent. DAWSON, YOUNGBERG.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Sls 311. **Soil Water and Plant Growth.**
3 hours fall. 3 ①
Basic soil-water-plant relationships; management of soil water for crop production under interaction of soil water with other crop production practices and non-irrigated conditions. One all day Saturday field trip required. Prerequisite: Sls 210. ULLERY.

Sls 314. Soil Management and Conservation.
4 hours spring. 3 ① 1 ③
Identifying, analyzing, and solving problems; wise use of soil for agriculture and alternate purposes; conservation farming; climate, topography, vegetation, geomorphology, soil; drainage, irrigation, erosion control, tillage, fertility, organic matter, crop rotation, salinity-alkalinity. Saturday and weekend field trips to be arranged. Prerequisite: Sls 210. DAWSON.

Sls 324. Soil Fertility.
3 hours winter. 2 ① 1 ②
Relation between chemical, physical, and biological properties of soils and availability of nutrients; soil amendments, fertilizer materials, predicting response from fertilizers, nutrient interactions, manure and crop rotations in a fertility management program. Prerequisite: Sls 210. JACKSON.

Sls 401. Research.
Sls 405. Reading and Conference.
Terms and hours to be arranged.

Sls 407. Seminar.
1 hour each term. 1 ①

Sls 408. Workshop. (g)
Terms and hours to be arranged.
Soils information designated either for specific locality in Oregon or to cover selected topics in soils, such as soil management, soil survey, soil fertility, soil physics, irrigation.

Sls 412. Soil Chemistry. (G)
3 hours winter. 3 ①
Important chemical phenomena in soils; basic structures and properties of main type of clays; exchange reactions: chemical phenomena of individual elements in soils. Prerequisite: Sls 210; Ch 234 or equivalent. VOLK.

Sls 413. Soil Chemical Analysis. (G)
2 hours winter. 2 ③
Application of analytical chemistry and instrumentation: ion extraction and fixation, exchange capacity, free sesquioxides, organic matter, exchange acidity, lime requirement, mineral identification, conductivity. Taken concurrently with Sls 412. Prerequisite: Sls 210; Ch 234 or equivalent. VOLK.

Sls 421. Soil Physics. (G)
3 hours fall. 3 ①
Physical properties of soil including structure, moisture, temperature, and aeration, and their measurement. Prerequisite: Sls 210. BOERSMA.

Sls 422. Soil Physics Laboratory. (G)
2 hours winter. 2 ③
Techniques for examining or evaluating various physical properties of soil. Prerequisite: Sls 421. ULLERY.

Sls 432. Soil Morphology and Survey.
(g) 4 hours spring. 3 ① 1 ③
Soils in place; distribution patterns; morphology of major groups; soil survey techniques. Saturday field trips required. Prerequisite: Sls 210 and course in geology. KNOX.

Mb 452, Soil Microbiology. (G)
5 hours. 3 ① 2 ③
See MICROBIOLOGY for course description.

Graduate Courses

See also courses marked (g) and (G) above.

Sls 501. Research.
Sls 503. Thesis.
Sls 505. Reading and Conference.
Sls 507. Seminar.
Terms and hours to be arranged.

Sls 511. Soil Genesis and Classification.
3 hours winter. 3 ①
Soil development, mineral weathering, soil forming factors and processes as related to soil landscape formation and soil classification. Prerequisite: Sls 432. Offered alternate years. Offered 1974-75.

Sls 512. Chemical Processes in Soil Systems. 3 hours winter. 3 ①
Physical and colloidal chemistry of soils: theory of ion distribution and exchange, pH measurements of soils, solid solution equilibria, oxidation-reduction, chelation. Prerequisite: Sls 412; Ch 425. Offered alternate years. Offered 1974-75. MOORE.

Sls 513. Soil Fertility.
3 hours winter. 3 ①
Chemical and physical processes affecting plant response from nutritionally important elements, current literature and approaches to soil fertility and plant nutrition research, predicting response from nutrients, effects of fertilizers on nutrient content of plants. Prerequisite: Sls 324; 2 years of chemistry. Courses in plant physiology and soil chemistry recommended. JACKSON, MOORE.

Sls 514. Forest Soils.
3 hours winter. 3 ①
Soil as a medium for forest growth. Relation of physical, chemical, and biological properties of soil to site and the occurrence and growth of forest vegetation. Soil survey and forest ecology courses recommended. Offered alternate years. Not offered 1974-75. YOUNGBERG.

Sls 515. Practicum in Teaching.
2 to 4 hours.
Developing skills and competence in teaching soil science under staff supervision; organization and presentation of instructional material by assisting in laboratory, recitation, and lectures.

Sls 521. Soil Physics.
3 hours spring. 3 ①
Theoretical and applied soil physics with special attention to transport phenomena in porous media. Prerequisite: Sls 421; calculus. Offered alternate years. Not offered 1974-75. BOERSMA.

Sls 522. Plant-Water Relations.
3 hours spring. 3 ①
Quantitative aspects of the distribution, movement, and function of water in the soil-plant-atmosphere continuum. Prerequisite: Sls 421, or Ch 442, or permission of instructor. Offered alternate years. Not offered 1973-74. BOERSMA.

Sls 523. Clay Mineralogy.
3 hours spring. 2 ① 1 ③
Principles of structure; structure of phyllosilicates; theory and practice of identification by X-ray diffraction, differential thermal analyses, chemical and physical properties; formation, alteration, and occurrence of clays. Chemistry, physics, and mineralogy courses recommended. Offered alternate years. Offered 1973-74. HARWARD.

VETERINARY MEDICINE

Courses in veterinary medicine are designed for students who expect to handle or manage both domestic and game animals. Anatomy and physiology of animals familiarize the student with the normal form, structure, and function of the animal body. Comparisons are made between the domestic and the common species of game animals. Diseases are considered from viewpoint of owner or manager of animals. The epizootiology and nature of disease, hygiene and sanitation, care of sick animals, quarantine and segregation, and the importance of State and Federal programs for the control and eradication of contagious and infectious animal diseases are considered. Students are not trained to enter the veterinary profession.

Lower Division Courses

VM 50. Preveterinary Medicine.
1 hour fall and spring. 1 ①
Introduction to the profession's role in society. P-N graded.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

VM 311. Anatomy and Physiology of the Fowl. 3 hours winter. 2 ① 1 ②
Structure and physiology of fowl. Offered alternate years. Not offered 1974-75.

VM 320,321. Anatomy and Physiology of Domestic Animals. 4 hours fall and winter. 3 ① 1 ②

VM 341. Diseases of Livestock.
4 hours fall. 4 ①
Elementary consideration of hygiene, sanitation, and other methods of livestock disease control for students not majoring in animal production.

VM 441. Animal Diseases and Control.
(g) 5 hours spring. 3 ① 2 ②
Predisposing and primary causes of disease, epizootiology and practical disease control. Prerequisite: VM 321.

VM 451. Avian Diseases. (g)
3 hours spring. 3 ①
The pathology of avian diseases; program for control. Prerequisite: VM 311. Offered alternate years. Offered 1974-75.

VM 452. Avian Diseases Laboratory.
(g) 2 hours spring. 2 ②
Laboratory studies to accompany VM 451. Prerequisite: VM 311. Offered alternate years. Offered 1974-75.

Z 454. Principles of Symbiosis. (g)
4 hours spring. 2 ① 2 ②
(See Zoology)

VM 461. Parasitic Diseases of Domestic and Game Animals. (G)
5 hours. 3 ① 2 ③
Characteristics, life cycles, pathogenesis, immunity, epizootiology, control, and treatment of animal parasites that cause disease in domestic and game animals or are zoonoses. Prerequisite: two years of biology.

Graduate Courses

VM 501. Research.
VM 503. Thesis.
VM 505. Reading and Conference.
VM 507. Seminar.
Terms and hours to be arranged.

VM 511,512,513. Systematic Pathology.
3 hours each term. 1 ① 2 ②
VM 511: Reticulo-endothelial system: tissue changes in parasitic, allergic, and granulomatous conditions. *VM 512:* digestive system, liver, and pancreas. *VM 513:* urinary, genital, respiratory, and hemopoietic systems. Prerequisite: 12 hours of pathology. Taken in any sequence. Offered alternate years. Offered 1974-75.

VM 521,522,523. Systematic Pathology.
3 hours each term. 1 ① 2 ②
VM 521: Nervous, circulatory, endocrine, and muscular systems. *VM 522:* Skeletal system, organs of special sense and common integument. *VM 523:* Exotic diseases. Special pathology of laboratory animals, fur-bearers and birds. Prerequisite: 12 hours of pathology. Taken in any sequence. Offered alternate years. Not offered 1974-75.

Agricultural Experiment Station

The Oregon Agricultural Experiment Station is an integral part of the OSU School of Agriculture. Its research function in the agricultural, biological, environmental, and social sciences is described in the RESEARCH section of this Catalog.

The Experiment Station staff, most of whom also teach courses in the schools of Science, Agriculture, or Home Economics, are listed below.

GREGORY BURTON WOOD, Ph.D., Associate Dean and Director.
WILSON HOOVER FOOTE, Ph.D., Associate Director.
ROBERT WESLEY HENDERSON, Ph.D., Assistant Director.
DAVID PAUL MOORE, Ph.D., Assistant Director.

PROFESSORS EMERITUS Besse, Bollen, Bullis, Gentner, Gross, Haag, E. Hansen, Howell, Jensen, S. Jones, Kolshorn, Krueger, Mackey, Martin, McArthur, Mehlig, Oveson, Rodenhiser, Sawyer, Schoth, Scullen, Storvick, Thompson; ASSOCIATE PROFESSOR M. Conklin; ASSISTANT PROFESSOR Schallig; SENIOR INSTRUCTOR Woodring

Agricultural Chemistry: PROFESSORS Freed (department head), Beaudreau, Fang, Terriere, Tinsley, Wagner, Weswig
ASSOCIATE PROFESSORS Morris, Whanger
ASSISTANT PROFESSOR Adams
SENIOR INSTRUCTORS Kiigemagi, Montgomery
RESEARCH ASSOCIATES Buhler, Chen, Davis, Deinzer, Deeny, Dost, Gillet, Haque, Lee, Lindstrom, Mate, Miller, Pearson, Reinert, Ridlington, Wulf

Agricultural Economics: PROFESSORS Eisgruber (department head), Blanch, Brown, Edwards, Halter, Sitton, Stoevener
ASSOCIATE PROFESSORS Conklin, Holmes, Johnston, Langmo, Miller, Rettig, Stevens, Youde, Youmans
ASSISTANT PROFESSORS Hammonds, Meier, Nelson, Reeder, Trierweiler
RESEARCH ASSOCIATES Bhagia, Liao, Pendse, Schmisseur
INSTRUCTORS Coppedge, Dawson, Kuntz, H. Thomas, Vesterby, Wilkes, Wilkins

Agricultural Engineering: PROFESSORS Davis (department head), Booster, Cropsey, Kirk, Long, Matson, Shearer, Willrich, Wolfe
ASSOCIATE PROFESSORS Brandenburg, Brooks, Klein, Miner, Page, Park
ASSISTANT PROFESSORS George, Wensink; INSTRUCTOR Haglund

Agronomic Crop Science: PROFESSORS Cowan (department head), Appleby, Chilcote, Ching, Foote, Frakes, Goetze, Grabe, Horner, Kronstad, Leach, Martin, McGuire, Metzger, Rodenhiser, Rhode
ASSOCIATE PROFESSORS Calhoun, Hardin, Haunold, Miller, Plucknett, Rampton, Youngberg
ASSISTANT PROFESSORS Bates, Billings, Bolton, Lee, Rydrych, Stamp; RESEARCH ASSOCIATES Hepworth, Powelson, Lindstrom
INSTRUCTORS Danielson, Kolding, Olson, Roberts, Swanson

Animal Science: PROFESSORS Oldfield (department head), Bogart, Church, England, Gates (program director, Rangeland Resources), Ralston
ASSOCIATE PROFESSORS Kennick, Stormshak, Stout, Wu
ASSISTANT PROFESSORS Cheeke, Hohenboken, Krueger, Pulse, Reagan, Savelle, Swanson, Winward.
RESEARCH ASSOCIATES Burkhart, Pyott
SENIOR INSTRUCTOR Adair; INSTRUCTORS Gashler, McDaniel

Botany and Plant Pathology: PROFESSORS T. Moore (department head), Allen, Bartsch, Bishop, Cameron, W. Chilcote, Converse, Corden, Evans, Hardison, Horner, Jensen, Leach, Phinney, Roth, Shay, Vaughan, Zak
ASSOCIATE PROFESSORS Coyier, Culver, Denison, Hampton, Linderman, Maloney, McIntire, Powelson, Trappe, Trione
ASSISTANT PROFESSORS Dooley, Knutson, L. Moore, Nelson

Entomology: PROFESSORS Oman (acting department head), Crowell, Goulding, Krantz, Ritcher, Rudinsky, Stephen, Swenson, Terriere
ASSOCIATE PROFESSORS Anderson, Nagel, Rosenstiel
ASSISTANT PROFESSORS AliNiazee, Berry, Kamm
RESEARCH ASSOCIATES Roberts, Schonbrod, Tweedy, Yu

Fisheries and Wildlife: PROFESSORS Warren (acting department head), Bond, Horton, Kuhn, Rayner, Simon, Wight
ASSOCIATE PROFESSORS Breese, Davis, Donaldson, Fisher, Hall, McNeil, Shumway, Verts, Vohs, Weber
ASSISTANT PROFESSORS Caldwell, Garrison, Jarvis, Lightfoot, McIntyre, Meslow, Snow, Wagner; RESEARCH ASSOCIATES Larson, Sedell; INSTRUCTORS Iwamoto, Juntunen, Lantz, Seim

Food Science and Technology: PROFESSORS Schultz (department head), Cain, McGill, Morgan, Sinnhuber
ASSOCIATE PROFESSORS Anglemier, Beavers, Bills, Bodyfelt, Crawford, Krumperman, Law, Montgomery, Scanlan, Wales, Wrolstad, Yang, Yu
ASSISTANT PROFESSOR Varseveld; INSTRUCTORS G. Putnam, Soderquist; RESEARCH ASSOCIATES Babbitt, D. Lee, J. Lee, Libbey, Miller, Nixon, Pawlowski

Home Economics Research: PROFESSORS Hawthorne (coordinator), Woodburn, Yearick
ASSOCIATE PROFESSORS Miller, Peters
ASSISTANT PROFESSORS Benson, Bubl
SENIOR INSTRUCTOR Edwards

Horticulture: PROFESSORS Weiser (department head), Apple, Baggett, Garren, Mack, Roberts, Ticknor, Westwood
ASSOCIATE PROFESSORS Chaplin, Crabtree, Lagerstedt, Lawrence, Martins, Thompson, Wadsworth
ASSISTANT PROFESSORS Fuchigami, Richardson

Microbiology: PROFESSORS Elliker (department head), Anderson, Fryer, Morita, Parks, Pilcher, Sandine
ASSISTANT PROFESSOR Seidler

Poultry Science: PROFESSORS Arscott (department head), Bernier, Harper, Parker
ASSISTANT PROFESSOR Dorminey

Publications: ASSISTANT PROFESSORS Beall, Floyd

Soil Science: PROFESSORS Cheney (department head), Allmaras, Boersma, Dawson, Gardner, Harward, Jackson, D. P. Moore, Simonson, Vomocil, Youngberg
ASSOCIATE PROFESSORS Dyrness, D. G. Moore, Ramig, Volk, Young
ASSISTANT PROFESSORS Harris, Rickman, Ullery
RESEARCH ASSOCIATES Barlow, Norgren; INSTRUCTOR Kauffman

Statistics: PROFESSORS Calvin (department head), Mason, Petersen; VISITING PROFESSOR Everson
ASSOCIATE PROFESSORS Faulkenberry, Rowe
ASSISTANT PROFESSOR Hartmann; RESEARCH ASSOCIATE Scheurman

Veterinary Medicine: PROFESSORS Wedman (department head), Bone, Peterson, Smith
ASSOCIATE PROFESSORS Dost, Hall, Helfer, Kistner, Knezevich, Mattson, Patton, Schmitz, Snyder
ASSISTANT PROFESSORS Coles, Erickson, Robinson
RESEARCH ASSOCIATES Koller, Stroud

Branch Experiment Stations: PROFESSORS Allmaras, Lombard, Mellenthin, Raleigh, Rohde, Ticknor, Westigard
ASSOCIATE PROFESSORS Hoffman, M. Johnson, Martin, Pumphrey, Ramig, Rydrych, Yungen, Zwich
ASSISTANT PROFESSORS Carter, Davidson, Gomm, Phillips, Rickman, Rittenhouse, Sheets, Sneva, Stanger, Vavra
RESEARCH ASSOCIATES Facteau, C. Wang; INSTRUCTOR Kolding

Oregon State University Extension Service

ADMINISTRATIVE STAFF

JOSEPH REW COX, M.S., Director of OSU Extension Service and Associate Dean of Agriculture.
GWIL EVANS, A.M., Chairman, Extension Communication
KENNETH S. HILDERBRAND, M.S., Program Leader (Marine Advisory)
JAMES T. KRYGIER, Ph.D., Program Leader (Forestry)
ANN LITCHFIELD, Ph.D., Assistant Director (Family Living), Associate Dean of Home Economics
H. JOE MYERS, M.S., Assistant Director (4-H Youth)
W. G. NIBLER, M.Ed., Assistant Director (Agriculture)
LOUIS M. OESTER, Ed.D., Coordinator, Training
JACKSON W. ROSS, M.S., Assistant Director (County Programs)
THEODORE H. SIDOR, M.S., Assistant Director (Community Development)

Central Staff: PROFESSORS Hagelstein, Torvend, Wick
ASSOCIATE PROFESSORS Kiesow, Klein

Extension Communication: ASSOCIATE PROFESSORS Calvert, Salisbury, W. C. Smith
ASSISTANT PROFESSORS Holthouse, Kingsley
INSTRUCTORS Alvarez, Jackson

Emeritus Staff: PROFESSORS Allen, Bennion, Brown, Carpenter, Clark, Cordy, Ewalt, Fisher, Foster, L. Gross, N. J. Hansen, Hutton, Inskeep, Jackson, Jenkins, Johnson, Lear, Mack, Monroe, Newell, Peterson, Reid, Sager, Sandquist, Scales, Scheel, C. L. Smith, C. W. Smith, H. Smith, Strawn, Taskerud, Thomas, Warren, Zundel
ASSOCIATE PROFESSORS Douglass, Ebert, Fletcher, Fluent, Funk, Hagg, F. Hall, P. Hall, Hauser, Huber, Jendrzejewski, Landforce, Mallalieu, McCarty, Ottaway, Parker, Rawlings, C. Ross, Roy, Shannan, Skinner, Taylor, Teal, Webster, Wright
ASSISTANT PROFESSORS Allyn, Bierman, Bromley, Brown, Clevenger, Cook, Dewey, Hilty, Horrell, Irving, Lee, Marsh, Perry, C. Price, Workman

AGRICULTURE

Agricultural Chemistry: PROFESSOR Witt
Agricultural Engineering: PROFESSORS Davis (department head), Matson, Shearer, Willrich

Agricultural Economics: PROFESSORS Eisgruber (department head), Becker, Groder, Wyckoff
ASSOCIATE PROFESSORS Conklin, Marks, Seat, F. Smith, Youmans
ASSISTANT PROFESSORS Hammonds, Meier, Nelson, Reeder, Wyatt
INSTRUCTOR Miles

Agronomic Crop Science: PROFESSORS Cowan (department head), Goetze
ASSOCIATE PROFESSORS Brewer, Youngberg
ASSISTANT PROFESSORS Beckham, Bolton, Burr, Gutbrod, Tiger, Vough
INSTRUCTORS Danielson, Hagen
RESEARCH ASSOCIATE Hepworth

Animal Science: PROFESSORS Oldfield (department head), Frischknecht, Gates, Landers
ASSOCIATE PROFESSOR H. P. Adams
ASSISTANT PROFESSOR Krueger

Entomology: PROFESSORS Oman (acting department head), Capizzi
ASSISTANT PROFESSOR Robinson

Fisheries and Wildlife: ASSOCIATE PROFESSOR Vohs

Food Science and Technology: PROFESSOR Kifer (department head)
ASSOCIATE PROFESSORS Bodyfelt, Davidson, Milleville

Horticulture: PROFESSORS Weiser (department head), Garren
ASSOCIATE PROFESSOR Stebbins
ASSISTANT PROFESSOR Mansour

Plant Pathology: PROFESSORS T. C. Moore (department head), MacSwan
ASSISTANT PROFESSOR Koepsell
INSTRUCTORS J. R. Dilworth, Jr., L. Johnson, B. Moore

Poultry Science: PROFESSOR Arscott (department head)
ASSOCIATE PROFESSOR Fischer

Soils: PROFESSORS Cheney (department head), Gardner, Vomocil
ASSISTANT PROFESSOR Harris
INSTRUCTOR Kauffman

Veterinary Medicine: PROFESSOR Wedman (department head)
ASSOCIATE PROFESSOR Reynolds

COMMUNITY DEVELOPMENT

PROFESSOR Wyckoff
ASSOCIATE PROFESSORS Abbott. Pease
ASSISTANT PROFESSORS Harris, Wyatt
INSTRUCTOR Miles

FAMILY LIVING

PROFESSOR Hawthorne (dean)
Family Life: PROFESSORS O'Neill (department head), Anderson

Food and Nutrition: PROFESSOR Woodburn (department head)
ASSOCIATE PROFESSOR Bussard
ASSISTANT PROFESSORS Forest, Lewis

Home Economics Education: ASSOCIATE PROFESSOR S. Lee (department head)

Home Management: PROFESSOR Johnston
ASSOCIATE PROFESSOR Brown

Clothing, Textiles, and Related Arts: PROFESSOR Petzel (department head)

FORESTRY

Forest Engineering: ASSOCIATE PROFESSOR G. Brown (department head)
ASSISTANT PROFESSOR Berglund
INSTRUCTOR Garland

Forest Management: PROFESSOR J. R. Dilworth, Sr. (department head)
ASSOCIATE PROFESSOR Sutherland
ASSISTANT PROFESSORS Sander, Cleary

Forest Products: PROFESSOR Resch (department head)
ASSOCIATE PROFESSOR McMahon
ASSISTANT PROFESSOR Schuldt

4-H YOUTH

PROFESSOR Redman
ASSOCIATE PROFESSORS D. Johnson, McAlister
ASSISTANT PROFESSORS Breese, Winkenwerder

MARINE ADVISORY PROGRAM

ASSOCIATE PROFESSORS Davidson, R. B. Fisher, F. Smith
ASSISTANT PROFESSORS Giles, Jacobson, Panshin
INSTRUCTORS Condon, Faudskar, Heikkila, Osis, Otness

EXTENSION FIELD STAFF

PROFESSORS N. C. Anderson, Baron, Berry, Black, Bond, Cate, Frizzell, Hesketh, Kirsch, Mikesell, Novotny, Roberts, Rudd, Saul, W. Schroeder, Sprowls, Sterling, T. W. Thompson

ASSOCIATE PROFESSORS D. Adams, W. Andersen, D. E. Anderson, L. Bailey, Bain, Bedell, Besse, Binder, Bluhm, Brog, Brougher, Bunch, D. Burkhart, W. Burkhart, L. Cannon, Clark, Conner, Farrell, Gavin, Gurton, M. Hamilton, Harvey, Hatch, Hickerson, Hochhalter, Huber, Jossy, Kerr, Massie, Maxwell, Minnick, Mitchell, Mosher, Parsons, Preisz, Rauen, J. Schroeder, Thienes, J. G. Thompson, Vandehey, Von Borstel, Walrod, Werth, Wilcox, Wills, Winters, Wood, Young, Zimmerman, Zinn

ASSISTANT PROFESSORS Bonham, Brookhyser, Brown, B. Burkhart, J. Burr, Burridge, C. Cannon, Christensen, L. Davis, Dunning, Epple, Fitch, Friedemann, Friedrichsen, Grimes, R. Hamilton, Hart, Hay, Hockett, Hoecker, Isley, Killingsworth, Kreag, Leffel, LeSueur, Lundbom, Lunner, Markgraf, McCormick, Mellott, Oehler, Parker, Passon, Rackham, Schneider, Shibley, Stevely, Thingvold, Torbeck, Whitlow, Yost

INSTRUCTORS D. Anderson, Alexander, Ashley, Atwood, Barker, Beeson, Boldt, J. Brown, Burt, Carlson, Carter, Church, Clement, G. Cook, Day, Dowswell, Fletcher, Gamroth, Gingrich, Goodman, Greenlund, Hathaway, Herbst, Howell, Hulett, Jacks, Jamieson, Johnston, Keir, Knothe, Lindland, Miller, Mobley, D. Moore, Nesbitt, Palmer, Pattie, Paulsen, Phillips, Phipps, Pruitt, Renk, Robertson, Rumsey, Salzer, Sawyer, Spiesschaert, Strode, Stulken, Sunday, Tillson, Vargas, Wandschneider, Weimar, Williams, Withers, Zurcher.

Oregon State University's Extension Service provides informal education to adults and young people throughout Oregon. Its mission is to deliver the best informal educational programs that are responsive to people's needs—in agriculture, family living, forestry, marine resources, community development, and 4-H youth activities. It carries out its mission by extending the research knowledge base of the University to people who need the information and provides leadership in applying this knowledge to the problems people have identified.

Anyone may take part in Extension Service offerings and the Extension staff is actively involving Oregonians who may not previously have used Extension Service programs. Thousands of Oregon citizens assist in Extension programs by leading and teaching groups.

For efficiency and for program quality, the Extension Service conducts its work on the basis of planned programs approved by the University and the U.S. Department of Agriculture. There are six major Extension educational programs:

Agricultural Production and Marketing—Extension educational programs in agricultural production apply technology in organizing and operating a farm and in conserving and developing agricultural resources. Subject matter fields in which Extension makes important efforts are agricultural chemistry, agricultural economics, agricultural engineering, animal health, animal science, range resources, agronomic crop science, entomology, food science, fisheries and wildlife, horticulture, plant pathology, poultry, and soils.

Extension programs in agricultural marketing apply technology to improve the efficiency of processing, handling, and distributing farm products. Many of these educational efforts are with marketing firms.

Family Living, Home Economics, and Consumer Education—Extension's educators deliver sound, University-based knowledge to individuals and families in their homes and communities so they can make informed choices and decisions. They provide experiences and literature with which people can develop the leadership skills necessary to make use of information available to them. Public programs are offered in consumer education, family finance, housing, home furnishings and appliances, child development, interpersonal relationships, clothing and textiles, nutrition and health, and gerontology. The family living program reaches people in organized study groups; through workshops and other short courses; through correspondence courses; through self-study centers; through individual contacts by paraprofessional assistants and leader-teachers; and through newsletters, bulletins, newspaper articles, films and slides, and radio and television.

Forestry—The forestry extension program is dedicated to improving economic and environmental benefits from Oregon's forest resources and related industries. It does this through varied educational programs which include reforestation, forest stand improvement, multiple-use decisions, watershed protection, resource recreation planning, logging methods, wood technology and marketing, housing, Christmas tree production, and conservation.

Marine Advisory Program—The Marine Advisory Program is dedicated to the practical, managed use of ocean resources for the economic, recreational, scientific, and aesthetic benefit of man. While it is not alone in serving those ends, it is unique in the marine field for the productive blending of research and teaching with government and industry. The Marine Advisory Program is the link between people who use the ocean and people who study and manage it.

The program—partially supported by the OSU Sea Grant College—has expanded toward a total systems approach for development of marine resources. It has increased effort in marine economics, seafood technology, marine science information transfer, industrial applications of oceanographic information, marine science education for the public, and fishing gear development. Marine extension work has continued in areas that marine resource users have identified as important.

Community Development—This educational program applies knowledge and develops leadership skills to help communities make better use of their resources. The program deals with all the resources of a community: its people, its economy, and its natural resources. In it, people learn to organize and lead groups. They learn how to resolve public issues, and the political process through which public decisions are achieved and implemented. Extension professionals work with people to plan and develop public facilities for health, safety, recreation, and general economic and social improvements. Community development programs also focus on long-range planning for conserving and using natural resources in the public interest.

4-H Youth—By providing informal, off-campus education for young people between 9 and 19, Extension's youth programs help participants acquire knowledge, skills, and attitudes that will contribute to their active participation as citizens in a democratic society. Many educational projects are oriented to agricultural and home economics subjects, but there is a variety of other subjects, too. As a part of all programs, young people learn to understand, appreciate, and conserve natural resources.

Among the special programs are marine science tours, conducted in cooperation with public schools, that create awareness and understanding of Oregon's unique marine resources. Forestry tours, mostly with sixth-grade classes, emphasize the magnitude and importance of forest industries. The Neighborhood Youth Corps assists young people in 23 counties to gain work experience and helps them make money for continued education.

Developing and Delivering Programs—Extension educational programs are developed in response to needs of people in Oregon. These needs are identified by Extension's staff of county agents, who are located in and serving every one of Oregon's 36 counties. Agents, working with people to assess their needs, tell members of Extension's on-campus specialist staff what needs they have identified. Specialists prepare useful educational programs for delivery by the agents. More than half of Extension's staff is located off-campus in field offices. Financial support is broad-based, from county, state, and federal sources.

BUSINESS AND TECHNOLOGY

FACULTY

As of January 1974

EARL GODDARD, Ph.D., Dean of the School of Business and Technology

WILBUR W. WIDICUS, JR., Ph.D., Associate Dean and Director of Graduate Programs

ROBERT F. MCCAIN, Ph.D., Head Adviser

PROFESSORS EMERITUS Campbell, Larse, LeMaster, Orner, Pfanner, Seaton, Yerian

DEPARTMENTS IN BUSINESS ADMINISTRATION

Accounting and Management Science: PROFESSOR Newton
ASSOCIATE PROFESSORS Martin, McFarlane (department chairman), Shirley
ASSISTANT PROFESSORS Abrassart, Bailes, Barber, Bloomfield, Carpini, Neyhart, Paschke, Sevilla (visiting), Weiler, Woodworth
INSTRUCTORS Appel, Johnson, Malecha, Perry, Phillips, Sargent, Sasaki, Swick, Varin, Wendel

Business Environment and Organizational Behavior: PROFESSORS Easton, Goddard, Lundberg (department chairman), Rettig, Schreima
ASSOCIATE PROFESSORS Amano, McCain, Soule
ASSISTANT PROFESSORS Connor, Gudger, Karmel, Park, Shane, Walters, Weber
INSTRUCTORS Dalton, Hutchins, Klein

Marketing, Finance, and Production: PROFESSORS Dane, Egan, Strickler (department chairman), Stonehill
ASSOCIATE PROFESSORS Browne, Gray, Monks, Schary, Stitzel, Widicus
ASSISTANT PROFESSORS Bates (visiting), Becker, Miller
INSTRUCTORS Korn, Mason, Melvin

Office Administration: PROFESSOR Winger
ASSOCIATE PROFESSOR Jones
INSTRUCTORS Palmer, Wheeler

OTHER DEPARTMENTS

Business Education: PROFESSOR Winger
ASSISTANT PROFESSOR Beringson

Distributive Education: ASSISTANT PROFESSOR Hlebichuk

THE OBJECTIVE OF THE SCHOOL OF BUSINESS AND TECHNOLOGY is to provide students with the professional preparation necessary for successful careers in modern business. Emphasis is placed not only upon the concepts and analytical techniques of business decision making, but also upon the obligations and opportunities of businessmen for effective service to society.

The School is accredited by the American Association of Collegiate Schools of Business.

The School offers five degree programs:

Business Administration, with areas of concentration in accounting, financial management, management, management science, marketing management, personnel management, agribusiness, international business, and general business. Minors, which are taken along with a concentration in business administration, are available in science, mathematics, behavioral science, computer science, and science-technology.

Office Administration, a course of study which provides essentially the same preparation in business administration as is attained by students majoring in that degree program, plus course work in those business areas which apply directly to office administration.

Business Education, Residential Institution Management, and Hotel and Restaurant Management are all joint-degree programs. The Business Education program is offered by the School of Business and Technology and the School of Education. It has areas of emphasis in office occupations education, distributive education, and basic business accounting education. (See SCHOOL OF EDUCATION for a description of this program.) The Residential Institution Management program is jointly offered by the School of Business and Technology, the School of Home Economics, and the Division of Health and Physical Education. This program provides professional training in the management of such residential institutions as nursing homes, extended care facilities, homes for the aged, etc. The program in Hotel and Restaurant Management is offered jointly by the School of Business and Technology and the School of Home Economics. See page 83 for a description of these programs.

High School Preparation

The following high school courses are recommended for students planning to enroll in the School of Business and Technology: English, four years; mathematics, four years; history and social studies, three years; typing, one year; natural science, two years.

University Honors Program

The Honors Program in this School is coordinated with the programs in other Schools and administered by the Director of the University Honors Program (see page 30). Information concerning eligibility and application forms may be obtained from the Director.

Transfer Students

Students planning to transfer into the School of Business and Technology should, when feasible, do so prior to or during the sophomore year. Those planning to transfer from a community college should consult the *Community College Transfer Programs Booklet*, or the business adviser at the community college, to determine the most appropriate courses to complete prior to transfer. The School of Business and Technology's Head Adviser may also be contacted for advice.

Counseling and Placement

The School of Business and Technology has experienced counselors who are available to advise students in all academic matters plus the areas of career choice and job placement. Faculty members are available to assist students in any way they can.

The services of the Placement Coordinator of the University are available to all students seeking information concerning placement opportunities, interviews with visiting firms, and general information concerning career objectives.

Degrees Offered

Curricula are offered which lead to the degree of Bachelor of Arts (B.A.), Bachelor of Science (B.S.), Master of Business Administration (M.B.A.), and Master of Science in Management Science (M.S.). For advanced degrees see GRADUATE SCHOOL.

Concurrent Degrees

Students who wish to obtain a degree in Business Administration combined with a degree in other areas in which degrees are offered at OSU, can enroll in the concurrent degree program. The requirements to qualify for two degrees are listed elsewhere in this Catalog. Students who intend to obtain one of their degrees in Business Administration should see the Head Adviser of the School of Business and Technology as soon as possible.

Curricula in Business Administration

Business Administration

The curriculum in Business Administration reflects the increasingly complex economic, social, and technological aspects of modern business decision-making. The study of Business Administration is combined with a minor in science, or science-technology, and with work in other academic areas. In all course work, emphasis is given to the development of effective decision-making, including an understanding of personal values and motivation, and an awareness of the interrelationhip between business and society.

Freshman Year

	Hours
Introduction to Business (BA 101)	4
Introduction to Business Data Processing (BA 131)	3
[1] Mathematics (Mth 161,162,163)	12
English Composition (Wr 121)	3
[2] Electives *or* officer education	23
Physical education or personal health	3
	48

Sophomore Year

Principles of Economics (Ec 213,214)	8
Quantitative Business Methods (BA 235)	4
Introduction to Management Science (BA 238)	4
Financial Accounting (BA 211)	4
Managerial Accounting (BA 212)	4
[3] Minor	9
[2] Electives *or* officer education	14
Physical education	1
	48

Junior Year

Management Processes (BA 302)	4
Operations Management (BA 311)	4
Marketing (BA 312)	4
Finance (BA 313)	4
Business Law (BA 315)	4
Organizational Behavior (BA 361)	4
Technical Report Writing (Wr 327)	3
[3] Minor	9
[2] Electives	12
	48

Senior Year

Business and Its Environment (BA 495)	4
Business Policy (BA 499)	4
[4] Business administration (concentration)	17–22
[3] Minor	9
[2] Electives	9–14
	48

[1] Students minoring in mathematics or industrial engineering should substitute Mth 110 for Mth 163.

[2] In selecting their electives, students seeking the B.S. degree must be sure they satisfy the university science requirement (36 hours in either science or social science, or 45 hours in both).

[3] Sophomore business administration students are required to register in an approved minor in science or science-technology or mathematics (see pp. 104-105). Courses in geography, nursing, photography, or science education *are not* acceptable to fulfill the minor requirement.

[4] Students majoring in business administration are required to choose an area of concentration no later than the beginning of the senior year.

Areas of Concentration

Students in Business Administration must complete 17-22 term hours of upper division business administration or related courses in one of the areas of concentration listed below.

ACCOUNTING AND COST CONTROL

Junior Year

	Hours
Intermediate Financial Accounting I (BA 317)	4
Intermediate Financial Accounting II (BA 318)	4
Advanced Financial Accounting (BA 419)	3

Senior Year

Advanced Managerial Accounting (BA 422)	5
Auditing (BA 427)	3
Taxation and Business (BA 438) or the Federal Tax System (BA 425)	4–3
Related course	3

RELATED COURSES

Contemporary Issues in Managerial Accounting (BA 423)
The Federal Tax System (BA 425)
Adv Acctng Theory (BA 426)

FINANCIAL MANAGEMENT

Senior Year

	Hours
Money and Capital Markets (BA 441)	5
Portfolio Management (BA 443)	4
Financial Structure and Policy (BA 447)	4
Financial Planning and Control (BA 448)	4
Related course	5–4

RELATED COURSES

Taxation and Business (BA 438)	4
Risk Management (BA 445)	5
International Financial Management (BA 485)	4
Contemporary Issues in Financial Accounting (BA 420)	4
Cost Accounting (BA 421)	3

MANAGEMENT

Junior or Senior Year

	Hours
Management and Organization Theory (BA 460)	4
Advanced Organizational Behavior (BA 461)	4
Any three related courses	12

RELATED COURSES

Management Decision Making (BA 493)	4
Organizational Dynamics (BA 494)	4
Management and Labor (BA 496)	4
Management Planning (BA 497)	4

MANAGEMENT SCIENCE

Senior Year

Business Systems (BA 436)	4
Business Systems (BA 437)	4
Management Science (BA 434)	4
Management Science (BA 435)	4
Any related course	4–3

RELATED COURSES

Simulation in Business (BA 455)
Business Data Processing Systems (BA 331)
Computer Simulation (St 417)
Introduction to Symbolic Language Programming FORTRAN (CS 213)
Management Planning (BA 497)
Management Decision Making (BA 493)

MARKETING MANAGEMENT

Junior or Senior Year

	Hours
Marketing Management (BA 471)	5
Marketing Systems (BA 472)	4
Related courses	8–10

RELATED COURSES

Mgmt of Mrktng Com (BA 473)
Consumer Behavior (BA 476)
Business Logistics (BA 474)
Marketing Models (BA 478)
International Marketing (BA 484)
Simulation in Business (BA 455)

PERSONNEL MANAGEMENT AND INDUSTRIAL RELATIONS

Senior Year

	Hours
Personnel Management (BA 467, 468)	6
Case Problems in Personnel Management (BA 469)	3
Labor Problems (Ec 425)	3
Labor Legislation (Ec 426)	3
Labor Economics (Ec 427)	3

INTERNATIONAL BUSINESS

Senior Year

	Hours
International Marketing (BA 484)	4
International Financial Management (BA 485)	4
International Environment and Management (BA 486)	4
Related courses	6–8

RELATED COURSES

International Economics (Ec 440,441, 442)
Economic Development (Ec 445,446)
Concepts of Internat Rel (PS 417)
International Law (PS 442)
The Far East (Hst 391,392,393)
Europe Since 1789 (Hst 343)
or
Approved courses in business administration
Latin-American Civ (Hst 350, 351,352)
Economic Survey of Latin America (Ec 448)
Comparative Economic Systems (Ec 450,451)
Economic History of Modern Europe (Ec 454)

AGRICULTURAL BUSINESS MANAGEMENT

Senior Year

	Hours
Agricultural Marketing (AEc 311)	5
Plant Efficiency Analysis (AEc 421)	3
Land and Water Economics (AEc 461)	3
Public Policy in Agriculture (AEc 411)	3
Agricultural Finance (AEc 431)	3
Related course	3

RELATED COURSES

Agri Econ Anal (AEc 312)
Livestock Economics (AEc 440)
International Agri Dev (AEc 462)
Monetary and Banking Theory (Ec 411,412)

GENERAL BUSINESS

The student electing the general business concentration must take 18 hours of upper division business administration or related courses. A maximum of three approved upper division courses in economics may be accepted in lieu of business administraton courses.

Minors

A minor in either science or science-technology is taken by all students majoring in business administration. Minors are designed to assist students to become effective business executives by acquainting them with the increasingly important scientific and technological considerations in modern business decisions.

Students may select a minor which: (a) covers broad, basic scientific concepts related to many different business areas or industries, (i.e., the natural sciences), *or* (b) relates to career interests in specific industries, (i.e., forestry or food technology), *or* (c) contributes directly to improved professional competence in business, (i.e., computer science or industrial engineering).

Minors available to business administration majors are listed below. In addition, special minors may be arranged in agriculture, engineering, home economics, and naval science to fit the needs of individual students. Students who are interested in a special minor should consult the Head Adviser of the School of Business and Technology.

SCIENCE

	Term hours F	W	S
Sophomore Year			
[1] Natural science sequence	3–4	3–4	3–4
Junior Year			
[1] Three natural science courses, dependent upon or related to the sophomore-year natural science courses or Natural science sequence in another area	3–4	3–4	3–4
Senior Year			
Natural science courses, related to each other and dependent upon or related to the sophomore-year and/or the junior-year natural science courses or [2] Other approved courses	3–4	3–4	3–4

APPLIED MATHEMATICS

Professor EDWARD KAPLAN, Adviser

	Term hours F	W	S
Freshman Year			
Calculus (Mth 111,112,113)	4	4	4
Sophomore Year			
Elementary Linear Algebra (Mth 241)	4	....	....
Junior and Senior Years			
[2] Approved courses in mathematics, statistics, or computer science	3–4	3–4	3–4

AGRICULTURE

	Term hours F	W	S
Sophomore Year			
Science courses related to junior- and/or senior-year minor courses	3	3	3
Junior Year			
Science courses basic to, or prerequisite to, senior-year minor courses	3	3	3
Senior Year			
Related courses	3	3	3

The related courses must be chosen from *one* of the following departments of the School of Agriculture: ANIMAL SCIENCE, FARM CROPS, FISHERIES AND WILDLIFE, HORTICULTURE, POULTRY SCIENCE, SOILS, or AGRICULTURAL ENGINEERING.

BEHAVIORAL SCIENCE

Professor CAROL A. SASLOW, Adviser

	Term hours F	W	S
Sophomore Year			
General Psychology (Psy 200)	5	..	..
Junior Year			
Experimental Psychology (Psy 321)	4	..	..
Attitude and Opinion Methodology (Psy 442)	..	3	..
Introduction to Statistics (St 312)	..	..	3
Senior Year			
[2] Courses in minor option	6	3	3

COMPUTER SCIENCE

Professor Curtis Cook, Adviser

	Term hours F	W	S
Sophomore Year			
Introduction to Computer Science (CS 211)	4	..	..
Computer Organization (CS 212)	..	4	..
Introduction to Symbolic Language Programming: FORTRAN (CS 213)	..	..	4
Junior Year			
[2] Approved courses in mathematics, statistics, or computer science	3–4	3–4	3–4
Senior Year			
[2] Approved courses in mathematics, statistics, or computer science	3–4	3	..

[1] Chemistry and physics especially recommended. Courses in geography, mathematics, nursing, science education, and statistics are not acceptable.
[2] Courses approved by the Head Adviser, School of B & T.

FOOD TECHNOLOGY

Professor P. H. Krumperman, Adviser

Sophomore Year	Term hours F	W	S
General Chemistry (Ch 104,105)	5	4	..
or			
General Chemistry (Ch 201,202,203)	3	3	3
Junior Year			
Introductory Microbiology (Mb 130)	3	..	..
Nutrition (FN 225)	..	4	..
Senior Year			
Food Technology (FST 201)	5	..	..
Food Quality (FST 202)	..	4	..
Elementary Food Science (FST 350)	..	..	4

RELATED COURSES

Animal Science (AnS 121)
Meats (AnS 351)
Federal and State Food Regulations (FST 421)
Elements of Horticulture (Hrt 111)

FORESTRY

Professor W. I. West, Adviser

Sophomore Year	Term hours F	W	S
Introduction to Forestry (F 111)	4	....	....
Wood Technology and Utilization (FP 210)	....	4	....
[2] Courses in minor option	....	....	3
Junior Year			
[2] Courses in minor option	3	....	3
Logging Methods (FE 392)	....	3	....
Senior Year			
[2] Courses in minor option	3	3	3

INDUSTRIAL ENGINEERING

Professor James Riggs, Adviser

Freshman and Sophomore Years	Term hours F	W	S
Calculus with Analytical Geometry (Mth 111,112)	4	4	..
Junior and Senior Years			
Methods, Motion and Time Study (IE 361)	..	5	..
or Systems Analysis I (IE 371)	..	5	..
Quality and Reliability Control (IE 491)	4	..	..
Material Handling and Control (IE 492)	..	..	3
Related courses	4	3	..

[1] Different options in the Behavioral Science minor are recommended for students concentrating in marketing and in management or personnel. See Head Adviser, School of Business and Technology, for course lists.

[2] Business administration students minoring in forestry must complete 16-18 hours in one of the following forestry minor options: Forest management; natural resource conservation; forest engineering; wood industry management; or wood industry: pulp and paper. Students should consult the head adviser of the School of Business and Technology for the specific courses required in each option.

RELATED COURSES

Engineering Economy (Engr 390)
Industrial Environment Safety (IE 390)
Environmental Design (IE 441)
Industrial Supervision Principles (IE 451)
Critical Path and Related Scheduling Methods (IE 455)
Engineering Economic Analysis (IE 490)

INSTITUTION MANAGEMENT

Professor Virginia Harger, Adviser

Food Service Management Option:

Sophomore Year	Term hours F	W	S
Chemistry (Ch 104,105,106) *or* (Ch 201,202,203)	5–3	4–3	4–3
Junior Year			
Nutrition (FN 225)	4	..	..
Foods (FN 215)	..	5	..
Senior Year			
Quantity Food Prod (IM 311)	4	..	..
Purch for Inst (IM 440)			
or Org and Mgmt of Food Serv (IM 445)	..	5	..

RELATED COURSES

Meal Management (FN 313)
Microbiology (Mb 130)

Gerontological Institution Management Option:

Sophomore Year	Term hours F	W	S
Chemistry (Ch 104,105,106) *or* (Ch 201,202,203) or	5–3	4–3	4–3
Microbiology (Mb 130) and	3	..	..
Physiology (Z 331,332)	3	3	..
Junior Year			
Nutrition (FN 225)	4	..	..
Food Service Systems (IM 410)	..	3	..
Senior Year			
[1] Core in Gerontology	4	4	4

RELATED COURSES

Institution Management: Reading and Conference (IM 405)
Institution Management Projects (IM 406)
Elements of Interior Design (AA 223)

SPECIAL MINORS

Special Minors must follow the outline below and must be approved by the Head Adviser *before* the second year of the minor begins.

First (or Second) Year
Natural science sequence, preferably one related to other courses in the minor 9–12

Second (or First) Year
Science and/or mathematics (in addition to Freshman mathematics requirement) related to other courses in the minor 9–12

Third Year
Courses in Agriculture, Engineering, Home Economics, preferably within one department 9–12

[1] This 12-hour sequence is offered through the University of Oregon. Students interested in this option should consult their Head Adviser to make the special arrangements which are necessary.

Courses in Business Administration

The business administration degree program is one in which all courses are planned to enhance the student's educational experience. Introductory and background courses are offered in the first two years. Junior and senior courses build upon this background and provide professional preparation in business administration.

Courses numbered in the 400's are restricted to students with junior or senior standing.

Lower Division Courses

BA 101. Introduction to Business. 4 hours. 4 ①
Business organization, operation, and management intended to orient the student in the field of business and to help the student to determine a field of major concentration.

BA 131. Introduction to Business Data Processing. 3 hours. 3 ①
Concepts, elements, and structure of business data processing systems; classifying, calculating, and reporting functions; programming, computer fundamentals.

BA 199. Special Studies.
Terms and hours to be arranged.

BA 211. Financial Accounting. 4 hours. 4 ①
Financial reporting to outsiders. The accounting cycle: income determination/asset valuation. Financial statement preparation and analysis.

BA 212. Managerial Accounting. 4 hours. 4 ①
Providing information for management decisions. Data accumulation for product costing, for performance evaluation and control, and for planning. Prerequisite: BA 211.

BA 217. Basic Accounting and Financial Analysis. 3 hours. 3 ①
For students who take only one term of accounting. Methods of recording, summarizing, and presenting accounting data. Emphasis on basic principles and terminology; significance, analysis, and interpretation of accounting data; accounting as tool of management.

BA 231. Business Data Processing. 4 hours. 4 ①
Application of computers *to* business data processing using COBOL. The development of a common business-oriented computer language and its use in modern business organizations. Comparison of COBOL with other automatic programming languages. Prerequisite: BA 131.

BA 235. Quantitative Business Methods. 4 hours. 4 ①
Management decision processes utilizing statistical methods; use and application of probability concepts, sampling procedures, parameter estimation, regression analysis, etc. to the analysis and solution of such business problems as income and cost estimation, sales forecasting, performance evaluation, inventory analysis, and quality control. Prerequisite: Mth 161.

BA 238. Introduction to Management Science. 4 hours. 4 ①
Management decision processes utilizing mathematical models; use and application of modeling techniques, mathematical programming, decision theory, and simulation to the analysis and solution of such business problems as inventory control, capital budgeting, consumer behavior, and resource allocation. Prerequisite: Mth 163; BA 235.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

BA 301. Business Conditions Analysis. 4 hours. 4 ①
Forecasting business conditions; business cycle theories; forecasting techniques including econometrics, input-output, indicators, naive and qualitative models. Prerequisite: Ec 214. Not offered 1974-75.

BA 302. Management Processes. 4 hours. 3 (1⅓)
Systematic examination of basic management processes within an enterprise; planning development of objectives and plans; organizing, structuring work relationships; leading, actuating coordinated effort; controlling, measuring progress, and taking corrective action, emphasizing an overall framework for effective integration of the distinct processes. Prerequisite: junior standing.

BA 311. Operations Management. 4 hours. 4 ①
Decision making methods in the management of production of goods and services. Equipment justification, system analysis, inventory management, simulation, quality control, work methods, facilities selection. Prerequisite: BA 235; junior standing.

BA 312. Marketing. 4 hours. 4 ①
Industrial and consumer markets and activities and enterprises involved in distributing goods to those markets. Objective to develop understanding of distribution processes, marketing problems and principles. Prerequisite: junior standing.

BA 313. Finance. 4 hours. 4 ①
Role and functions of financial manager in modern business firm; environment in which he operates; formulation of financial objectives and policies; financial analysis, forecasting, planning, and control; cash, credit, and asset management; acquisition of funds through short term and long term borrowing, leasing, stock issue, and by internal means; dividend policy and other aspects of dealing with business owners. Prerequisite: BA 212; junior standing.

BA 315. Business Law. 4 hours. 4 ①
Nature and function of the law in our business society; obligations arising out of tort; formation, performance, and discharge of contracts.

BA 317. Intermediate Financial Accounting I. 4 hours. 3 (1⅓)
Basic accounting theory and practice, concepts of valuation of assets in financial statements, income determination. Prerequisite: BA 212.

BA 318. Intermediate Financial Accounting II. 4 hours. 3 (1⅓)
Concepts of valuation of liabilities and owners' equities, compilation, interpretation, and analysis of financial statements. Prerequisite: BA 317.

BA 331. Business Data Processing Systems. 4 hours. 3 (1⅓)
Use and application of computers to process business data. Use of a high level file-processing language, such as COBOL, and its applicability in modern business organizations. Business data systems, file design and manipulation, feasibility studies, and consideration of management problems in reference to accounting and control processes. Prerequisite: BA 131 and BA 212.

BA 361. Organizational Behavior. 4 hours. 3 (1⅓)
Introductory concepts in behavior in organizations; interpersonal group and inter-group relationships. The student will participate in group projects designed to encourage application of behavioral principles. Prerequisite: junior standing.

BA 405. Reading and Conference. (g) Terms and hours to be arranged.
Supervised individual work in some field of special application and interest. Subjects chosen must be approved by professor in charge. Consent of instructor required. Prerequisite: senior or graduate standing.

BA 407. Seminar. Terms and hours to be arranged.

BA 410. Business Internship. 1 to 6 hours.
Planned and supervised work experience at selected cooperating business firms. Supplementary training conference, reports, and appraisals. Consent of instructor required. Prerequisite: upper division standing.

BA 413. Business Law. 3 hours. 3 ①
Legal aspects of property rights, commercial transactions, and forms of business organizations. Prerequisite: BA 315.

BA 414. Real Estate Law. 3 hours. 3 ①
Creation and rights of ownership under various estates, title protection, deeds, wills, and inheritance; property transactions related thereto, including contracts, mortgages, leases, and brokerage.

BA 415. Environmental Law: Water and Air. (g) 3 hours. 3 ①
Legal relationships arising out of rights to natural resources: rights to air, water, and navigable streams; control of pollution and the impact of federal and state legislation. Prerequisite: junior standing.

BA 419. Advanced Financial Accounting. (G) 3 hours. 3 ①
Advanced financial accounting techniques and reporting procedures regarding corporate acquisitions, mergers, and pooling of interest. Prerequisite: BA 318.

BA 420. Contemporary Issues in Financial Accounting. 4 hours. 3 (1⅓)
Current problems and issues in corporate reporting. Role of the APB in establishing accounting principles, auditor's role in public reporting, problems in asset evaluation and income determination. Accounting majors or persons having taken BA 317 may not take this course for credit. Prerequisite: BA 212.

BA 421. Cost Accounting. (G) 3 hours. 3 ①
Cost behavior, profit planning, cost accounting control systems and standards, performance reports, distribution cost analysis. Intended primarily for nonbusiness students. Prerequisite: BA 212.

BA 422. Advanced Managerial Accounting. (G) 5 hours. 3 (1⅔)
Cost accounting theory, reporting for planning and control, concepts of performance reporting, variance analysis, cost analysis, cost accounting models, transfer pricing. May not be taken for credit by students who have taken BA 421. Prerequisite: BA 212.

BA 423. Contemporary Issues in Managerial Accounting. (G) 3 hours. 3 ①
Internal accounting and reporting requirements problems; management accounting issues in non-profit oriented organizations. Prerequisite: BA 212.

BA 425. The Federal Tax System. (G) 3 hours. 3 ①
Taxation principles; economics and philosophies of the federal system, current and historical; processes of tax legislation, administration, and judicial review at federal level with reference to overlap at state level; determination of tax liabilities; revenue-raising sources; taxation of incomes. Prerequisite: BA 212; Ec 214.

BA 426. Advanced Accounting Theory. (G) 3 hours. 3 ①
Basis for accounting theory; accounting principles as guides to income determination and asset valuation. Prerequisite: BA 318.

BA 427. Auditing. (G) 4 hours. 3 (1⅓)
Environment and professional nature of auditing; concepts of testing, evidence, internal control, analysis of client accounting systems. Prerequisite: BA 317.

BA 434, 435. Management Science. 4 hours each term. 4 ①
BA 434: Application of the philosophy and methods of management science to deterministic business problems. *BA 435:* Application to nondeterministic business problems. Prerequisite: BA 238.

BA 436,437. Business Systems. 4 hours each term. 4 ①
BA 436: General systems theory. The elements, relationships, and procedures comprising goal-directed systems. Techniques for system definition, analysis, and control. Modeling concepts and the feedback system. Prerequisite: BA 238. *BA 437:* The business organization as an integrated information system. Identification, evaluation, and modification of information sources and needs as required for effective managerial decision-making. Information theory and case study. Prerequisite: BA 212.

BA 438. Taxation and Business. (G) 4 hours. 4 ①
The roles of taxes in business decisions; tax system; taxation problems; tax incidence and burden theories. Tax implication in selection of legal business organizational form, plant location, depreciation, executive compensation, raising funds, the contemporary scene. Prerequisite: BA 313.

BA 441. Money and Capital Markets. (G) 5 hours 3 (1⅔)
Money and capital markets, financial conditions analysis, cost and availability of funds, term structure of interest rates, analysis of flow of funds statements, financial intermediation. Prerequisite: BA 313.

BA 443. Portfolio Management. (G) 4 hours. 3 (1⅓)
Types of investments, risks in investments, measurement of risk, portfolio theory, types of investment policies, measurement of performance. Prerequisite: BA 441.

BA 445. Risk Management. (G)
5 hours. 3 ($1\frac{1}{3}$)
Risks and their treatment: risk concepts; risk management function; risk analyses, non-insurance treatment; scope of various business risks and treatment via insurance; understanding the insurance mechanism; property-liability and life-health risks. Prerequisite: BA 313.

BA 447. Financial Structure and Policy. (G) 4 hours. 3 ($1\frac{1}{6}$)
Financial structure and cost of capital; the dividend decision; acquisition of funds; mergers, acquisitions, and new enterprise financing; other activities related to the treasury function. Prerequisite: BA 313.

BA 448. Financial Planning and Control. (G)
4 hours. 3 ($1\frac{1}{6}$)
Financial planning, forecasting, and control techniques; capital budgeting; working capital management; other activities related to the control function. Prerequisite: BA 313.

BA 455. Simulation in Business. (G)
4 hours. 4 ①
Application of simulation techniques to the solution of business problems. The concepts and technical aspects of design, construction, operation, and analysis of business simulation models. Student projects to analyze a business situation using simulation concepts and models. Prerequisite: BA 131,238.

BA 457,458. Advanced Operations Management. (G)
3 hours each term. 3 ①
Overview of system theory, application of system theory to production systems, detailed development of the production system—depth study of material covered in BA 311. Decision models used in the management of production of goods and services. Prerequisite: BA 238,311. Not offered 1974-75.

BA 459. Case Problems in Operations Management (G) 3 hours 3 ①
To enable student to formulate an over-all picture of interrelationship of major aspects of production; actual cases drawn from industry. Prerequisite: BA 457,458. Not offered 1974-75.

BA 460. Management and Organization Theory. (g) 4 hours. 3 ($1\frac{1}{6}$)
Organization theory, including organizational objectives and goals, social interaction within the organization, and environmental forces as they bear on the management process. Examination and discussion of such issues as socialization, conflict, technology, and future trends. Prerequisite: BA 302.

BA 461. Advanced Organizational Behavior. (g) 4 hours. 3 ($1\frac{1}{6}$)
Study of organizational behavior at an advanced level; includes influence processes, attitude change, role theory, value conflict, motivation, perception, and communication processes. Prerequisite: BA 302,361.

BA 467,468. Personnel Management. (g) 3 hours each term. 3 ①
First Term: Survey of the field, including analysis of personnel objectives, functions, and practices as they relate to overall objectives of an organization. Prerequisite: BA 302.
Second Term: Deeper study of key areas covered in BA 467, with emphasis on the professional periodical literature in the field. Prerequisite: BA 467 for BA 468.

BA 469. Case Problems in Personnel Management. (g) 3 hours. 3 ①
Cases involving personnel problems and policy, drawn from real situations in business and industry. The student is given an opportunity to apply material learned in BA 467 and BA 468. Prerequisite: BA 467,468.

BA 471. Marketing Management. (g)
5 hours. 5 ①
Study of marketing management decision making, including use of model concepts and techniques. Emphasis upon the development and implementation of marketing strategies and programs. Prerequisite: BA 312.

BA 472. Marketing Systems. (G)
4 hours. 2 ②
Marketing systems and the interrelationship between competitive market structures and marketing management decisions. Unifying and controlling all marketing activities. Prerequisite: BA 471.

BA 473. Management of Marketing Communications. (G)
5 hours. 5 ①
Marketing communication systems and their effect on consumer choice and product differentiation from point of view of the marketing manager. Prerequisite: BA 312.

BA 474. Business Logistics. (G)
3 hours. 3 ①
Physical distribution system for movement of products to market and the development of service as a determinant of logistics system strategy. Includes channel structure and logistics strategy, the geography of distribution, transportation, and other elements in the distribution system; management of logistics as a system. Prerequisite: BA 312.

BA 476. Consumer Behavior. (G)
5 hours. 5 ①
Behavioral science concepts applied to consumer decisions and consumption patterns. Motives, perception, learning theory, and attitudes as influences on individual choice and brand loyalty. The use of social class and reference group theory in identifying and measuring target markets, fashion, and acceptance of innovation. Prerequisite: BA 312.

BA 478. Marketing Models. (G)
4 hours. 4 ①
Analysis and application of marketing models to marketing decisions: includes consumer behavior, segmentation, product pricing, promotion, and distribution. Prerequisite: BA 312.

BA 484. International Marketing. (G)
4 hours. 4 ①
Influence of foreign environments on choice of the marketing mix: product policy, pricing, channels of distribution, delivery, servicing, promotion, advertising, credit, and insurance; export and overseas marketing. Prerequisite: BA 312.

BA 485. International Financial Management. (G)
4 hours. 3 ($1\frac{1}{6}$)
International monetary environment; source and availability of funds to finance trade and multi-national operations; taxation; planning, control, and reporting; capital budgeting; risk; evaluation of performance. Prerequisite: BA 313.

BA 486. International Environment and Management. (G) 4 hours. 4 ①
Political, economic, cultural, and legal constraints on the management of multinational corporations; the colonial legacy; political and economic integration; economic planning; commercial policies; personnel and community relations; legal systems, arbitration and antitrust; organization structure. Prerequisite: senior standing.

BA 490. Fundamentals of Accounting.
4 hours. 4 ①
The basic postulates of accounting: theory and system for classification of economic activities of the firm. Form, content, and meaning of various financial statements and reports, including analytical ratios, trends, and interpretation. Cash flow, systems, cost accounting, and managerial uses of accounting data. Prerequisite: graduate standing or approval of Director of Graduate Studies in Business.

BA 491. Applied Business Statistics.
4 hours. 4 ①
Business information, business data, statistical inference, and hypothesis testing applied to business problems, index numbers, time series analysis, and business forecasting. Prerequisite: graduate standing or approval of Director of Graduate Studies in Business.

BA 492. Mathematics for Business Analysis. 4 hours. 4 ①
Mathematical methods, including differential and integral calculus, used in the analysis of business problems. Prerequisite: graduate standing or approval of Director of Graduate Studies in Business.

BA 493. Management Decision Making. (G) 4 hours. 3 ($1\frac{1}{6}$)
Processes, techniques, and interactive effects of administrative decision making in complex organizations. Prerequisite: BA 238,460 and 461 or BA 435,302, and 361.

BA 494. Organizational Dynamics. (G)
4 hours. 3 ($1\frac{1}{6}$)
Historical techniques for introduction of change in organizations, current models for organization change, process and content of organizational changes, organizational change in the future. Prerequisite: BA 460,461.

BA 495. Business and Its Environment.
4 hours. 4 ①
Social, political, economic, legal, ethical, and other environmental considerations relevant to the management of a business enterprise. Interaction between the societal environment and the business enterprise, including the social considerations in, and consequences of, managerial decisions. Prerequisite: senior standing.

BA 496. Management and Labor. (G)
4 hours. 3 ($1\frac{1}{6}$)
Development and management of human resources; collective bargaining from the management point of view. Prerequisite: BA 302,361.

BA 497. Management Planning. (G)
4 hours. 3 ($1\frac{1}{6}$)
Analysis of goal development and organizational means for achieving goals within an enterprise; concepts and methods for formulation of management strategies, policies, and procedures; applied planning techniques and methods. Prerequisite: BA 212, 302.

BA 498. Government Relations in Business. (G) 3 hours. 3 ①
Statutory, administrative, and common law controls affecting modern business and their influence on budgetary considerations, business structure, and administrative policies; importance of constructive attitude and recognition of government aids and services to business community. Prerequisite: senior standing.

BA 499. Business Policy.
4 hours. 2 ②
Advanced integrative course in analysis of top-management decisions, executive responsibilities, and company objectives. Policymaking is studied through business cases. Prerequisite: senior standing.

Graduate Courses
See also courses marked (g) and (G) above.

BA 501. Research.

BA 505. Reading and Conference.

BA 506. Business Projects.

BA 507. Seminar.
Terms and hours to be arranged.

BA 511. Analytical Techniques in Business Decision Making.
3 hours. 3 ①
Analytical techniques and concepts necessary in making business decisions concerning marketing, costs, profits, pricing, competition, production, and capital management. Forecasting techniques as related to decision making under conditions primarily of uncertainty. Prerequisite: 6 hours of undergraduate economics or Ec 499; graduate standing.

BA 512. Management and Organization Theories. 3 hours. 3 ①
Study of organization theories and concepts with the purpose of developing an integrated philosophy of management. Emphasis upon current research and concepts. Prerequisite: BA 302; graduate standing.

BA 513. Behavior in Business Organizations. 3 hours. 1 ③
A study of various aspects of formal and informal organizations, communications, motivation, leadership, individual and group behavior, and the administrator's role in interpersonal relationships as they influence and are influenced by business organizations. Prerequisite: BA 361; graduate standing.

BA 514. Marketing Management.
3 hours. 3 ①
Emphasis upon product development, marketing planning, selection of distribution channels, communication and demand stimulation, pricing, and marketing program evaluation. Prerequisite: BA 312; graduate standing.

BA 515. Financial Management.
3 hours. 3 ①
Emphasis upon financial planning, investment decisions, financial structure, cost of capital, acquisition of funds, and valuation. Prerequisite: BA 313; graduate standing.

BA 516. Operations Management.
3 hours. 3 ①
Emphasis upon research and development, plant and process planning, equipment acquisition and replacement, production planning and control, quality control, and production systems. Prerequisite: BA 311; graduate standing.

BA 517. Business in Its Environment.
3 hours. 3 ①
Interrelationship between business and society; problems, opportunities, and responsibilities faced by business executives in contemporary society. Prerequisite: graduate standing.

BA 519. Topics in Management Science.
3 hours. 3 ①
Management science techniques applied to managerial problems. Emphasis upon decision making in the major business functional areas of marketing, finance, production, and personnel, with special emphasis on role of management scientist in the decision making process. Prerequisite: graduate standing.

BA 520. Administrative Accounting.
3 hours. 3 ①
The adaptation of accounting to managerial operational planning, decision-making, and control. Concepts of cost, profits, value, control, planning, decision-making, uncertainty are inter-related. Prerequisite: BA 212 or BA 490; graduate standing.

BA 528. Business Conditions Analysis.
3 hours. 2 (1½)
Application of methods of economics and mathematics to analysis and forecasting of general business conditions; models in aggregate income analysis, business fluctuations and growth, and such forecasting techniques as input-output analysis, the "indicators" approach, statistical and econometric methods. Prerequisite: Ec 213,214 or Ec 499; graduate standing.

BA 531,532,533. Quantitative Business Analysis.
3 hours each term. 3 ①
First term: Electronic processing of business information; unified business data systems, computer concepts, systems analysis and design, management considerations involving the use of computers. Prerequisite: BA 131; graduate standing.
Second and Third Terms: Quantitative methods of analyzing business problems; mathematical model building, deterministic models, stochastic models, advanced business statistics, simulation techniques and management uses of quantitative methods. Prerequisite: for BA 532, BA 238; graduate standing. For BA 533, BA 235; graduate standing.

BA 541. Management Systems.
3 hours. 1 ③
Philosophy of systems; system and problem-solving methodology; theory of information feedback systems; analysis of total business system by interactions between flows and levels of information, money, personnel, capital equipment; development of experimental models to study system behavior and principles. Prerequisite: graduate standing.

BA 542. Information Systems.
3 hours. 1 ③
Concept of total information system; relationships between informational needs and the organization's structure, objectives, decision centers, information retrieval requirements; information needs to service management planning, execution and control; informational systems integrating various viewpoints. Prerequisite: BA 212 or BA 490; graduate standing.

BA 545,546. Management Problem Solving.
3 hours each term. 1 ③
Supervised research; analysis of a major problem area confronting a cooperating business firm; comprehensive written report on research undertaken and proposed solution or solutions. Prerequisite: graduate standing; BA 545 prerequisite to BA 546.

BA 599. Business Policy Formulation.
3 hours. 1 ③
Setting of organizational goals and formulation, evaluation, and implementation of alternative strategies to realize goals; case studies of companies in different industries of differing size and current condition to provide basis for basic organizational policies; opportunity to deal simultaneously with many interrelated aspects of company operation. Prerequisite: graduate standing.

Office Administration

The Office Administration curriculum is designed to prepare persons for secretarial and supervisory positions in office management. Students studying this curriculum take the same basic courses required of all business administration students, plus course work in typing, shorthand, and office practices. Graduates are well qualified for many office management positions in both business and government.

Freshman Year	Hours
Intro to Bus (BA 101)	4
Intro to Bus Data Proc (BA 131)	3
Mathematics (Mth 161,162,163)	12
English Composition (Wr 121)	3
Stenography (OA 112,113)	6
Typing (OA 122,123)	4
Physical education	3
[1]Electives	13
	48
Sophomore Year	
Financial Acctng (BA 211)	4
Managerial Acctg (BA 212)	4
Quant Bus Methods (BA 235)	4
Intro to Mgmt Science (BA 238)	4
Principles of Econ (EC 213,214)	8
Applied Steno (OA 211,212,213)	9
Personal Health (H 160)	2
[1]Electives	13
	48
Junior Year	
Management Processes (BA 302)	4
Operations Management (BA 311)	4
Marketing (BA 312)	4
Finance (BA 313)	4
Business Law (BA 315)	4
Bus Data Proc Systems (BA 331)	4
Organizational Behavior (BA 361)	4
Office Procedures (OA 311,312)	8
Technical Report Writing (Wr 327)	3
[1] Electives	9
	48
Senior Year	
Cost Accounting (BA 421)	4
Business Systems (BA 437)	4
Personnel Management (BA 467)	3
Bus and Its Environment (BA 495)	4
Business Policy (BA 499)	4
Office Org and Mgmt (OA 421,422)	6
[1] Electives	23
	48

[1] In selecting electives, students seeking the B.S. degree must satisfy the science requirement (36 hours in either science or social science, or 45 hours in both). Those seeking the B.A. degree must satisfy the language and humanities requirements.

Lower Division Courses

OA 111,112,113. Stenography.
3 hours each term. 4 ①
Gregg or machine shorthand. Theory of shorthand; practical applications in sentence and paragraph dictation. OA 121,122,123 must be taken concurrentiy unless the student has had the equivalent. Students with one year of high school shorthand may receive credit for OA 111 only upon recommendation of instructor.

OA 121,122,123. Typing.
2 hours each term. 5 ①
Theory and practice; drills of all kinds; punctuation and mechanical arrangement of business correspondence, legal forms, tabulating, manuscripts, modern business forms; straight copy timings; training on both manual and electric typewriters. Students who have had one year of typing may receive credit for OA 121 only upon recommendation of instructor.

OA 124. Typing.
2 hours. 5 ①
Speed, accuracy, figures, and remedial techniques. Use of wide variety of special drills, electric typewriters, and tachistoscope. Consent of instructor required.

OA 211,212,213. Applied Stenography.
3 hours each term. 3 ②
Advanced principles and phrases; dictation and transcripts covering vocabularies of representative businesses; legal forms; newspapers and magazine articles. Prerequisite: OA 113, 123, or equivalent.

OA 215. Business Machines.
3 hours. 3 ②
Rotary and printing calculators, key-punch machine, adding machines, addressing machines, voice-writing machines, stencil and fluid-process duplicators, electric typewriters. Prerequisite: one year of typing.

Upper Division Courses

OA 311,312,313. Office Procedure.
4 hours each term. 2 ① 2 ②
Most efficient stenographic methods and office practice; filing; advanced dictation; transcripts; reports; modern office appliances. Prerequisite: OA 213 or equivalent.

OA 321,322. Technical Reporting.
3 hours winter and spring. 3 ②
Advanced stenographic training in specialized business fields. Prerequisite: OA 123,213.

OA 407. Seminar.
1 hour fall or winter or spring 1 ①

OA 411. Secretarial Problems.
3 hours winter or spring. 3 ①
Duties and problems of the secretary in business and professions; relation to employer and fellow employees; office supervision. Prerequisite: senior standing.

OA 412. Secretarial Practice.
3 hours any term. 3 ①
Practical office experience. Ninety hours laboratory work in campus offices. Prerequisite: senior standing.

OA 421,422. Office Organization and Management.
3 hours each term. 3 ①
OA 421: fall or winter, *OA 422:* fall or spring. Scientific office management; organization: arrangement; operation; employment and training of office workers; efficiency problems; business ethics. Prerequisite: OA 313 or consent of instructor.

Curricula in Business Education and Distributive Education

Business Education

Business eduation options in basic business/accounting and office occupations education are designed to prepare teachers for primary, secondary, and post-secondary levels. The curricula for these options appear below. For business education course descriptions, see SCHOOL OF EDUCATION.

Office Occupations Education Option

This curriculum prepares persons to teach in the areas of typewriting, shorthand, and office practices. Job opportunities are readily available in education and business for persons completing this program.

Freshman Year	*Hours*
English Composition (Wr 121)	3
Math for the Biolog, Mgmt, and Soc Sciences (Mth 161)	4
Introduction to Business (BA 101)	4
Introduction to Data Processing (BA 131)	3
Typewriting (OA 122,123, or 124)	4–6
Physical education	3
Science/social science electives	12
Electives	15–13
	48

Sophomore Year	
General Psychology (Psy 200)	5
School in American Life (Ed 310)	3
Career Education (VEd 300)	3–4
Accounting (BA 211,212)	8
Economics (Ec 213,214)	8
Quantitative Bus Meth (BA 235)	4
Applied Stenography (OA 211,212,213)	9
Personal Health (H 160)	2
Science/social science electives	6
	48

Junior Year	
Educational Psychology (Ed 312)	3
Methods in Reading (Ed 350)	3
Marketing (BA 312)	4
Finance (BA 313)	4
Business Law (BA 315)	4
Organizational Behavior (BA 361)	4
Spec Sec Methods (typewriting) (Ed 408r)	3
Spec Sec Methods (basic bus/acctng) (Ed 408c)	3
Spec Sec Methods (shorthand) (Ed 408u)	3
Office Procedures (OA 311,312)	8
Science/social science electives	6
Electives	3
	48

Senior Year	
Psychology of Adolescence (Ed 461)	3
Student Teaching (Ed 416)	12–15
Seminar: Student Teaching (BEd 407)	1
Seminar: Observ and Activ (BEd 407b)	3
Business Environment (BA 495)	4
Business Policy (BA 499)	4
Org and Admin of Office and Distr Ed (BEd 450)	3
Coordination Techniques (BEd 451)	3
Office Org and Mgmt (OA 421)	3
Electives	12
	48

Basic Business/Accounting Option

Prepares persons to teach business subjects which are non-stenographic in nature. These include bookkeeping, business law, general business, consumer economics, business mathematics, etc.

Freshman Year	*Hours*
English Composition (Wr 121)	3
Math for the Biolog, Mgmt, and Soc Sci (Mth 161,162,163)	12
Introduction to Business (BA 101)	4
Introduction to Data Processing (BA 131)	3
Typewriting (OA 121,122, or 124)	4
Physical education	3
Science/social science electives	13
Electives	6
	48

Sophomore Year	
General Psychology (Psy 200)	5
Career Education (VEd 300)	3–4
School in American Life (Ed 310)	3
Accounting (BA 211,212)	8
Economics (Ec 213,214)	8
Business Data Processing (BA 231)	4
Quantitative Business Methods (BA 235)	4
Intro to Management Science (BA 238)	4
Business Law (BA 315)	4
Personal Health (H 160)	2
Electives	3
	48

Junior Year	
Educational Psychology (Ed 312)	3
Methods in Reading (Ed 350)	3
Management Processes (BA 302)	4
Operations Management (BA 311)	4
Marketing (BA 312)	4
Finance (BA 313)	4
Organizational Behavior (BA 361)	4
Spec Sec Meth (typewriting) (Ed 408r)	3
Spec Sec Meth (bas bus/acctng) (Ed 408c)	3
Office Org and Mgmt (OA 421)	3
Contemp Issues in Fin Acctng (BA 420)	4
Science/social science electives	10
	49

Senior Year	
Psychology of Adolescence (Ed 461)	3
Student Teaching (Ed 416)	12–15
Seminar: Student Teaching (BEd 407)	1
Seminar: Obs and Activity (BEd 407b)	3
Real Estate Law (BA 414) or Environmental Law (BA 415)	3
Cost Accounting (BA 421)	3
Business Environment (BA 495)	4
Business Policy (BA 499)	4
Org and Admin of Office and Distr Ed (BEd 450)	3
Coordination Techniques (BEd 451)	3
Electives	8
	47

Distributive Education

This curriculum provides persons with the competencies needed to be vocational teacher-coordinators and instructors in secondary, post-secondary, and adult-level DE/Marketing programs. For business education courses, see SCHOOL OF EDUCATION.

Freshman Year	*Hours*
English Composition (Wr 121)	3
Math for the Biolog, Mgmt, and Soc Sci (Mth 161,162,163)	12
Introduction to Business (BA 101)	4
Introduction to Data Processing (BA 131)	3
Typewriting (OA 121,122, or 124)	4
Physical education	3
Science/social science electives	13
Electives	6
	48

Sophomore Year	
General Psychology (Psy 200)	5
Career Education (VEd 300)	3
School in American Life (Ed 310)	3
Economics (Ec 213,214)	8
Business Law (BA 315)	4
Accounting (BA 211,212)	8
Quantitative Business Methods (BA 235)	4
Introduction to Mgmt Science (BA 238)	4
Personal Health (H 160)	2
Science/social science electives	3
Electives	4
	48

Junior Year	
Educational Psychology (Ed 312)	3
Methods in Reading (Ed 350)	3
Operations Management (BA 311)	4
Marketing (BA 312)	4
Finance (BA 313)	4
Management Processes (BA 302)	4
Organizational Behavior (BA 361)	4
Marketing Management (BA 471)	5
Org and Admin of Office and Distr Ed (BEd 450)	3
Coordination Techniques (BEd 451)	3
Methods in Distributive Ed (Ed 408v)	3
Methods in Basic Bus Acctng (Ed 408c) or Methods in Typing (Ed 408r)	3
Electives	5
	48

Senior Year	
Psychology of Adolescence (Ed 461)	3
Seminar: DE Practicum (BEd 407c,607c)	3
Projects (Programs in DE) (Ed 406a)	3
Student Teaching (Ed 416)	12–15
Seminar: Observation (BEd 407)	4
Marketing Systems (BA 472)	4
Business Environment (BA 495)	4
Business Policy (BA 499)	4
Science/social science electives	4
Related marketing electives	4
Electives	3
Supervised business internship (to be arr)	
	48

EDUCATION

FACULTY

As of January, 1974

STANLEY E. WILLIAMSON, Ed.D., Dean of School of Education
FORREST GATHERCOAL, J.D., Assistant Dean
MARGE MCBRIDE, Ed.D., Educational Placement Director
BERLAN LEMON, M.S., Head Adviser, Director, Office of Student Personnel Services
HENRY TEN PAS, Ed.D., Director, Undergraduate Studies in Education
WM. FIELDER, Ed.D., Director, Graduate Studies in Education

EMERITUS DEAN Franklin R. Zeran, Ph.D.
EMERITUS PROFESSORS Reichart, Seen, Yerian, Meeks, Baron
EMERITUS ASSOCIATE PROFESSOR K. Smith
EMERITUS ASSISTANT PROFESSOR Workinger

PROFESSORS Anderson, Atteberry, Beals, Bergstrom, Carpenter, Chick, Courtney, Davis, Fielder, Fox, Gardner, Hall, A. Leeland, L. Leeland, LeMay, Lumpkin, McQuesten, Munford, John O'Connor, Parr, Smith, Stevens, Ten Pas, Trow, Williamson, Winger, Wood

ASSOCIATE PROFESSORS Ahrendt, Armitage, Becker, Cadart-Ricard, Clark, Craven, Cross, Evans, Frazier, Gathercoal, Haun, Heuchert, Hoeye, Kiekel, King, Klein, S. Lee, B. Lemon, Miller, Purvis, Rands, Severeide, Strowbridge, Wall, White, Wilson

ASSISTANT PROFESSORS Anderson, Beringson, Britton, Bryan, Clay, Colbert, Cole, Dale, Firth, Galloway, Grieve, Haselton, Hlebichuk, Jiminez, Kenneke, McBride, Martin, Moeller, Nice, James O'Connor, Penn, Sanderson, Scrimsher, Stiehl, Wilson, Wyckoff

INSTRUCTORS Anderson, Andreason, Bibb, Griffin, Keller, Key, Kline, Robinson, Snyder, Spears, Visgatis, Wallace, Withycombe

THE SCHOOL OF EDUCATION at Oregon State University is accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary and secondary teachers and guidance counselors, with the doctorate the highest degree approved. The School offers both undergraduate and graduate work in elementary and secondary education and provides instruction—principally at the graduate level—in counseling and guidance, college student services administration, remedial reading, adult and community college education, and college and university teaching.

Instructional divisions

The *Division of Undergraduate Studies in Education* includes teacher preparation programs in elementary education and secondary education. The secondary teaching fields are art, English, modern languages, music, journalism, speech communication, social studies, science, mathematics, physical education, health, agriculture, business, distributive education, home economics, and industrial education.

The *Division of Graduate Studies in Education* includes teacher preparation programs leading to standard teacher certification and to master's and doctor's degrees in specified fields. See pages 116, 117.

Division of Undergraduate Studies in Education

HENRY TEN PAS, Division Director

Educational Foundations

Theory and Practicum: Field, Campus (Ed 210,311)
Frank Cross, Coordinator

Theory and Practicum: Field (Ed 313)
Jo Ann White, Elementary Coordinator
Carvel Wood, Secondary Coordinator

Student Teaching: Elementary, Secondary (Ed 415, 416)
Lucille Leeland, Elementary Coordinator
Lester Beals, Secondary Coordinator

Teaching Specialties

Elementary Education: Lucille Leeland, Coordinator

Liberal Arts Education: Lester Beals, Coordinator
(Art, English, Modern Languages, Music, Social Sciences, Speech)

Physical Education and Health: Robert Bergstrom, Coordinator

Science and Mathematics Education: Tom Evans, Coordinator
(Biology, Chemistry, Earth Science, Integrated Science, Mathematics, Physics)

Vocational Education: Wayne Courtney, Coordinator
(Agricultural Education, Business Education, Distributive Education, Health Occupations, Home Economics Education, Industrial Education)

See pages 116-123 for Graduate Studies in Education faculty and courses

Admission to School of Education

Any student who has met the admission requirements of the University may enroll in the School of Education. To transfer into the School of Education from another OSU school, the student must have the approval of the coordinator of the appropriate teacher education program and the Dean of Education.

Admission to Teacher Education Program

In addition to being admitted to the school, the student must be accepted into a *Program of Studies in Teacher Education* leading to certification. To be accepted into this program, a student must fulfill these requirements:

- Complete 75 term hours of course work, apply in writing to enter the program, and have the application accepted by a committee of the appropriate division.
- Meet GPA requirements for school and teaching field.
- Demonstrate ability to complete teaching norm in the teaching field.
- Show evidence of ability to work effectively as a classroom teacher and, after consideration by the committee, may be required to enroll in prior undergraduate experience programs.
- Be interviewed one or more times.

Elementary Education

A student preparing to teach in elementary schools must complete the courses listed in the curriculum below and the required number of hours in one of the areas of concentration.

General psychology is prerequisite to upper division education courses and should be completed by the end of the sophomore year. It is the only course in psychology which may be counted as part of the education major of 36 term hours.

Field experience programs are required and students should expect to be assigned in public schools for large blocks of time.

CURRICULUM

Freshman Year

	Hours
Math for Elem Teachers (Mth 191,192)	6
[1] Personal Health (Includes mental health) (H 160 or 170)	2
[1] Physical ed activities (WPE/MPE/CPE 100's)	3
English Comp (Wr 121) (Fall A-G Winter H-N Spring O-Z)	3
History of Am Civ (Hst 224,225,226)	9
Introductory Geography (Geog 105,106)	6
Biology (GS 101,102)	8
Speech (Sp 111)	3
Contemporary Ed (111E) (Fall A-G Winter H-N Spring O-Z)	2
[2] Electives	8
	48

Sophomore Year

[3] Minimum 40 hours of classroom participation	
Literature (any)	6
General Psychology (Psy 200)	5
[4] Physical Science (GS 104 and other physical science)	7
Music for Elementary Teachers (Mus 371)	4
Theory and Practicum: Field (Ed 210)	6
Theory and Practicum: Campus (Ed 311)	6
[3] Electives/area of concentration	14
	48

Junior Year

Elementary School Physical Education (PE 320)	3
Methods in Reading (Ed 350—some may take spring Soph)	5
Art in the Elementary School (Art 313)	3
Children's Literature (Eng 487)	3
Theory and Practicum: Elem (Ed 367)	15
[5] Electives/area of concentration	18
	48

Senior Year

Student Teaching: Elementary (Ed 415) (fall term, 15)	12
Seminar in Student Teaching (concurrent with 415)	3
Psychology of Childhood (Ed 460) (or Soph Block)	3
Adolescent Psychology (Ed 461) (or Soph Block)	3
School Health Ed (H 321) (includes mental health)	3
Science (any 6 hours)	6
(Selected seniors may participate in resident teaching)	
[6] Electives/area of concentration	18
	48

[1] Physical education and personal health may be taken concurrently.

[2] Either home economics or economics with emphasis in consumer science/area of concentration.

[3] See adviser for information.

[4] (Geology, Oceanography, GS 105,106).

[5] Area of Concentration—33 hours in art, Eng, math, mod lang, music, phys ed, (hlth), (leisure/rec), speech; 39 hours in social science.

Secondary Education

A student preparing to teach in secondary school must complete the courses listed below and also complete requirements for a Basic Norm in a teaching field. If he can supervise at least one student activity, he will find job opportunities better when he graduates. Activities which provide excellent training and experience for prospective teachers include intercollegiate and intramural sports, journalism, art, dramatics, debating, oratory, orchestra, band, chorus and other vocal groups, writing and producing radio and television programs, and student government. The electives recommended for freshmen and sophomores help broaden the educational experience and preparation, and may be used as a starting point in student activities.

Students preparing to teach grades 5-12 may graduate from the School of Education or the school or college in which they have their major teaching specialty. When graduating from a school or college other than the School of Education, the student must meet the graduation requirements of that school or college as well as requirements for certification. The following schools or colleges have departments that are shared with the School of Education: the School of Agriculture, Department of Agricultural Education; the School of Business and Technology, Department of Business Education; the School of Home Economics, Department of Home Economics Education; and the College of Science, Department of Science Education. The College of Liberal Arts shares the teacher education programs in art, English, journalism, modern languages, music, social studies, and speech communication. Programs in health education and physical education are presented through the Division of Health and Physical Education.

SECONDARY CURRICULUM

Freshman Year[1]

	Hours
English Composition (Wr 121)	3
Mathematics or a laboratory science other than psychology with laboratory (one-year sequence)	9–15
Physical education and hygiene	5
Courses in basic norm	9–18
[2] Other electives	9–18

Sophomore Year

[3] English Composition (Wr 222)	3
Theory and Practicum (Ed 210,311)	12
General Psychology (Psy 200)	5
Literature	9
Speech	3
History (Hst 101,102,103 or Hst 121,122 or Hst 201,202,203 or Hst 211,222)	9–10
Courses in basic norm	6–12
Electives	6–12

Junior Year

[3] English Composition (Wr 323)	3
Theory and Practicum (field) (Ed 313)	6
Special Secondary Methods (Ed 408)	3
Methods in Reading (Ed 350)	3
Outlines of Economics (Ec 115) or Economic Development of US (Ec 215)	4–3
Amer National Gov't (PS 201) or Amer State and Local Gov't (PS 203)	5
General Sociology (Soc 204) or General Anthropology (Anth 105)	3–5
Courses in basic norm	9–18
Electives	9–18

Senior Year

[4] Student Teaching: Secndy (Ed 416)	12–15
Seminar: Student Teaching (Ed 407)	3
Electives	24–30

[1] Courses in speech, literature, history, science, and physical education may be taken either freshman or sophomore year.

[2] In addition to meeting the requirements of this outline, students must meet institutional degree requirements. See Academic Regulations 26 and 27 in the *Schedule of Classes*.

[3] May be satisfied by demonstrated proficiency.

[4] To be preceded by all of required program in teacher education, including extensive field experience. Grade-point average of 2.50 in major field, 2.25 overall average required; must not be on probation.

The following are the Basic Norms for teacher certification in the teaching specialties offered at Oregon State University.

Agricultural Education

	Hours
Animal Industries (AnS 121,311; P 121; VM 341)	13
Plant Industries (Hort 111; ACS 211; Sls 210; F 344)	16
Agricultural Economics (AEc 211,311)	10
Agricultural Mechanics (Engr) (AET 211,221,317,325,391; MT 250)	18
Agricultural electives	13
	70

Internship

An intern must hold a Bachelor of Science degree in agriculture or be within one term of completing such a degree. The internship consists of a minimum of six months clinical experience in a public high school on at least one-half-time basis (3 periods per day). The employment is arranged in a public high school with an individualized program developed in cooperation with the hiring district and Oregon State University.

The normal academic load for an intern is nine hours per term for a total of 27 hours over the academic year.

Art

	Hours
Basic Drawing (Art 105)	4
Introduction to Visual Arts (Art 161)	4
Basic Design (Art 195)	4
Introduction to Art History (Art 261,262, 263)	9
Lower division art studio courses selected from seven of the following to include one 6-credit-hour sequence: Advertising Design, Art Crafts, Ceramics, Drawing, Metal Design and Jewelry, Painting, Printmaking, Sculpture, Three-Dimensional Design	18
History of Art (Art 364,365,366)	9
Art studio (300 level)	9
Art studio (400 level)	9
Art electives	6
	72

Business and Distributive Education

Business Education and Distributive Education curriculums are designed to meet the needs of prospective teachers in junior high, secondary, and post-secondary levels. The curricula in Business Education follow two tracks—basic business/accounting, and office occupations. The Distributive Education/Marketing program has a single curriculum.

Business Education

Basic Business/Accounting Option

Typewriting (4 hours), business administration courses, including advanced accounting and law (69 hours), economics (8), office organization and management (6), organization and administration of office and distributive education (3), coordination techniques (3) ..... 93 hours

Office Occupations Education Option

Typewriting (6), applied stenography (9), business administration courses (39), economics (8), office procedures (8), office organization and management (6), secretarial problems (3), organization and administration of office and distributive education (3), coordination techniques (3) ..... 85 hours

Distributive Education/Marketing

Business administration and marketing courses (64), economics (8), organization and administration of office and distributive education (3), coordination techniques (3), DE practicum (3), project programs (3) ..... 84 hours

English

A Major in English Must Include:

Survey of English Literature (Eng 101,102, 103) or World Literature (Eng 107,108, 109)	9
Shakespeare (Eng 201,202,203)	9
Upper division literature courses before 1800	9
Upper division literature courses after 1800	9
Upper division English courses:	
Literary Criticism	3
The Structure of English (Eng 491)	3
Literature for Teachers (Eng 488)	3

Courses in Addition to the English Major:

Composition for Teachers (Wr 411) or Advanced Expository Writing (Wr 316)	3
Oral expression (course in either speech, film, television, or drama)	3
General linguistics (course in either semantics, communication, or communication theories)	3
Three elective courses in language study, to include (1) general linguistics (semantics, communication, communication theories), and (2) cultural linguistics (history of the English language, modern grammar, language and culture, dialects, etc.)	9
	63

Health Education

Students who desire certification to teach health in grades K-12 will complete the courses listed in the Basic Norm. Opportunities are provided to combine grades 5-12 health certification with certification in other teaching fields such as physical education, social science, biology, and home economics education. See note 1.

	Hours
[1] Health Professions and Programs (H 123)	3
Personal Health (H 170)	3
Consumer Health (H 222)	3
School Health Education (H 321) (sec)	3
Drug Problems in Education (H 326)	3
Man, Health, Environment (H 331)	3
Com and Noncom Diseases (H 332)	3
Community Health (H 334)	3
[1]First Aid and Emergency Care (H 358)	3
Safety Education (Ed 360)	3
Seminar: Mental Health (H 407)	3
Sex Education (H 444)	3
[1] Health of the School Age Child (H 451)	3
Nutrition (FN 225)	3
Elementary Human Anatomy (Z 321)	3
[1] Physiology (Z 331,332)	6
	63

[1] Not required of students who also complete a Basic Norm in either physical education, biology, social science, or home economics education.

Home Economics Education

	Hours
Child Development (FL 225,311,413)	9
Nursery School Child (FL 425)	3
Clothing Construction (CT 210,212, or 213)	5–6
Clothing Selection (CT 211)	3
Textiles (CT 250)	3
Family Relationships (FL 322)	3
Nutrition (FN 225)	4
Foods (FN 215) or for students having Chemistry (FN 220,221)	5–8
Meal Management (FN 313)	3
Home Mgmt and Decision Making (HM 250)	3
Personal and Family Finance (HM 341)	3
Home Management House (HM 450) or Management of the Home (HM 460—for married women)	4
Household Equipment (HM 330)	3
Home Furnishings (CT 331)	3
Introduction to Home Economics (HEc 101)	1
Upper division elective	3
	58–62

Required related courses:

Physiology (Z 331,332) 6 hours
Principles of Economics (Ec 213) 4 hours
One year sequence in a laboratory science

Industrial Education

Industrial Arts Education

The four-year professional program in industrial arts education, leading to the degree of Bachelor of Science, meets certification requirements of all states except those requiring graduate study as a prerequisite to certification, and at the same time provides an excellent foundation for graduate study. Students should confer with the major adviser for counseling on objectives, program planning, and occupational opportunities. The courses required for a Basic Norm for a teaching certificate in industrial arts in Oregon are listed below.

A student preparing to teach industrial arts in secondary school must complete the courses shown under basic curriculum requirements for secondary education and also complete requirements for a Basic Norm in a teaching field. Courses required to meet the University and the School of Education requirements for a Bachelor of Science degree total 81-84 term hours for the industrial arts major.

	Hours
Introduction to Technologies (IA 131)	5
Graphic Communication (IA 252,253)	8
Mechanical Power (IA 241,242)	8
Electricity-Electronics (IA 271, 272)	8
Materials-Processes (IA 281,282)	8
Safety in Industrial Education (IED 477)	3
Technical electives	35
	75

Trade and Industrial Education

All students following the professional curriculum for trade and industrial education will report directly to the head of the department for counseling on objectives, program planning, and occupational opportunities. Appropriate electives in industrial education are selected with the approval of the major adviser.

BACHELOR OF SCIENCE DEGREE REQUIREMENTS

	Hours
English Composition (Wr 121)	3
Literature	9
Speech (Sp 111)	3
General Psychology (Psy 200)	5
History (Hst 101,102,103 or Hst 121,122 or Hst 201,202,203, or Hst 211,222)	9–10
Economic Dev of US (Ec 215)	3
American Governments (PS 201)	6
General Sociology (Soc 204)	3
Laboratory science or mathematics	16
Mathematics	4
Personal Health (H 160)	2
Physical Education (MPE or CPE 100-199)	3
Science and /or social science electives	13
	78–79

PROFESSIONAL EDUCATION

	Hours
Education foundations courses	15
Instructional Materials (IEd 482)	3
Industrial Education (IEd 281, Ed 408e, IEd 420)	12
Student Teaching (Ed 416)	15–18
Electives (teaching field)	24
	69–72

Credit through examination: Students with three or more years beyond the standard learning period of trade or industrial experience *may* be granted credit for such experience. The examination covering this experience is based as follows: 10% on length of experience, with a year's experience defined as 48 weeks as a wage earner. (The minimum period of experience acceptable under one employer is three months; in trades or occupations where assignment on short jobs is made through a union hiring hall, the assigning union may be considered the employer; experience in scattered fields is not acceptable.) 10% each on progression in the occupation, spread of experience, method followed to gain competency, and continuous character of occupational experience, 25% each on knowledge of technical content and performance ..... Maximum 48

Upon acceptance to the program and the completion of 45 hours of approved lower division academic course work, an individual may take his trade examination. However, the credits earned as a result of the examination will be entered in the Registrar's Office as *Incompletes* until he has completed 108 academic term hours, including all lower division courses required in the four-year program.

Teaching field electives	12
General electives	24
	192

BASIC NORM

Examination in teaching field plus recommended courses in teaching field based on the examination results.

	Hours
Required hours in teaching field	24
Electives in subject	9
	33

Cooperative Program

Outstanding graduates of two-year technical education curricula may be admitted into an Industry-School of Education cooperative program whereby twenty months are spent in industry as part of the teacher education requirements.

The total program requires a minimum of 144 term hours of classwork plus a maximum of 48 hours earned by completing a written and performance examination in the student's subject area. This examination is scored 50% on knowledge of technical content of subject and 50% on performance. A student must complete six terms of industrial experience, be accepted into the program, and have completed 45 term hours of approved lower division academic course work before he may take his trade examination. However, the credits earned as a result of the examination will be entered in the Registrar's Office as *Incompletes* until he has completed 93 academic term hours, including all lower division courses required in the program. Credits awarded will be applied toward the fulfillment of teaching field electives.

Journalism

Students taking a norm in journalism are advised also to have a Basic Norm in another teaching field, e.g., English.

	Hours
Journalism (J 111,112)	6
Journalism Laboratory (J 121)	1
Copyediting (J 214)	3
The Press and Society (J 450)	3
Editorial Writing (J 223)	3
Public Information Methods (J 318)	3
Photo-Journalism (J 334)	3
Electives chosen from J 317, 319, 351, 352, 353; Wr 319, 411; Sp 260, 366	8

Language Arts-Social Studies

Students in this norm have joint advisers in English and social studies and must take Ed 408, Special Secondary Methods, in both English and social studies, and do student teaching in both areas supervised by both departments.

Survey of American Literature (Eng 253,254,255)	9
Survey of English Literature (Eng 101,102,103)	9
World Literature (Eng 107,108,109)	9
Shakespeare (Eng 201,202,203)	9
Advanced Expository Writing (Wr 316 or Wr 317)	3
Composition for Teachers (Wr 411)	3
Development of the English Language (Eng 490)	3
Speech	3
History of the United States (Hst 201,202,203) or History of the United States (Hst 221,222)	9
History of Western Civilization (Hst 101, 102,103) or History of Western Civilization (Hst 121,122)	9
Introductory Geography (Geog 105,106, 107)	9
Six term hours in one or more of the following fields: political science, economics, sociology, anthropology	6
	81

Modern Languages

Students for whom the second-year course is waived or who are qualified to begin the program at a higher level will normally satisfy the Basic Norm of 45 hours with additional hours of approved electives. In some cases courses may be waived by examination or written confirmation by appropriate professional personnel that competencies have been demonstrated.

French

	Hours
Second-Year French (Fr 101,102)	8
Introductory Composition (Fr 201)	4
French Conversation (Fr 214)	4
Survey of French Lit (Fr 311,312,313)	12
Intermed French Comp and Conv (Fr 314, 315)	8
French Pronun and Phon (Fr 331,332)	4
French Culture and Civilization (Fr 328, 329)	4
* 400-level courses in French and/or linguistics	6
* Liberal arts courses in French culture and civilization	8
	62

German

Second-Year German (Ger 101,102)	10
Intermediate German (Ger 203)	4
German Pronun and Phonetics (Ger 331)	4
German Comp & Conv (Ger 334,335,336) or Survey of Ger Lit (Ger 343,344,345)	12 8–9
German Culture and Civ (Ger 340,341)	8
Additional 300- or 400-level German or linguistics (ML 451,453)	8
* Liberal Arts courses in German culture, civilization, literature, philosophy, music, or art	8
	64

* Must be approved by adviser.

Russian

	Hours
Second-Year Russian (Rus 101,102,103)	12
Russian Conversation (Rus 111,112,113)	6
Survey of Rus Lit (Rus 311,312,313)	9
* Additional upper-division hours in Russian	15
* History or social science courses dealing with Russian culture and civilization	12
	54

Spanish

Second-Year Spanish (Span 108,109)	8
Oral and Written Spanish (Span 209)	4
Spanish Conversation (Span 219)	4
Intro to Span Phonology (Span 250)	3
Survey of Span Lit (Span 342,343) and/or Survey of Spanish-American Literature (Span 344)	8
Intermed Span Comp and Conversation (Span 348,349)	8
Peninsular Culture and Civilization (Span 388) or Iberoamerican Culture and Civilization (Span 340)	4
* Additional upper-division Spanish or linguistics, including at least 6 hours at the 400-level	14
* Upper-division history or social science dealing with Hispanic culture and civilization	8
	61

* Must be approved by adviser.

Music

	Hours
Music Theory I (Mus 112,113)	8
Music Theory II (Mus 211,212,213)	9
Keyboard Harmony (Mus 214,215,216)	3
Applied Music	11
Introduction to Music and Its Literature (Mus 221,222,223)	9
History of Music (Mus 361,362,363) or History of Music (Mus 361,362) plus a 400-level Music Literature course (Mus 444-461)	9
Performing Organizations	5
Conducting (Mus 323,324,325) or Conducting (Mus 323,326,327)	6
Choral Emphasis	
Choral Arranging (Mus 411)	3
Instrumental Techniques (Mus 391-394)	2
Elective	3
Instrumental Emphasis	
Class Voive (Mus 181)	1
Band Arranging or Orchestration (Mus 414 or 417)	3
Instrumental Techniques (Mus 391-394)	4
	68

A piano proficiency examination, to be completed by the end of the junior year, is required of all students. Participation in a performance group is expected.

All music education majors are required to attend a specified number of concerts and recitals per term as determined by the faculty.

Physical Education

Students who desire to teach physical education in grades K-12 will complete the Basic Norm. Students who desire to teach both physical education and health education in grades 5-12 only, may modify the Basic Norm as noted below.

	Hours
[1] Professional Activ (PE 194,294,394,494)	20
Phil Basis of Human Movement (PE 211)	3
[2] Human Movement Aesthetics (PE 212)	3
Care and Prev of Ath Injuries (PE 259)	2
Psy Basis of Human Movement (PE 311)	3
Soc Basis of Hum Movement (PE 312)	3
Motor Dev in Childhd and Adol (PE 313)	3
Elem School Physical Ed (PE 320)	3
[2] Phys Ed Practicum (PE 333,334,335)	6
Athletic coaching course	2
Kinesiology (PE 423)	3
[2] Physiology of Exercise (PE 433)	3
School Programs (PE 441)	4
Evaluation of Physical Education (PE 443)	3
Adapted Physical Education (PE 444)	3
Elementary Human Anatomy (Z 321,322)	6
Physiology (Z 331,332)	6
	76

[1] For students who complete a Basic Norm in health education, 14 hours required in aquatics, body mechanics, dance, developmental activities, gymnastics, individual and team sports.

[2] Not required of students who also complete a Basic Norm in health education.

Science Education

Professional preparation for prospective teachers of integrated biological, earth, or physical science or matehematics in the middle school, the junior high school, or the senior high school is offered by the Department of Science Education, a joint department within the School of Education and the College of Science. A student preparing to apply for a teaching credential to teach science in grades 5-12 must complete the *common core* listed below and the requirements in one of the Basic Norms: integrated science, earth science, biology, physical sciences (chemistry or physics option), or mathematics.

Students may register either in the School of Education or in the College of Science. The common core and basic norm requirements are the same irrespective of the school or college in which the student is enrolled.

SCIENCE COMMON CORE

Required of all prospective science teachers

Biology	Hours
GS 101,102,103	12
* Bi 211,212,213 or Z 201,202,203; Bot 201,202,203	15–21
Chemistry	
Ch 104,105,106; Ch 201,202,203, *Ch 204, 205, 206	15
Geology	
G 201,202,203	6–9
* G 211,212,213	6–12
Physics	
Ph 111,112,113; Ph 201,202,203 or *Ph 211,212,213	6–12
Mathematics	
Mth 95,101,102,161,162,163; St 311,312, 451,452 (biology, integrated, or earth science norms)	10–12
* Mth 111,112,113 (chemistry, physics, and mathematics norms)	12

* Required of teachers whose teaching norm is in this area. Exceptions must receive departmental approval.

SCIENCE TEACHING NORM AREAS

Select one in addition to Common Core

Biology

ECOLOGY: Bi 370,371; GS 331; Bot 341	3–5
BOTANY: Bot 331,371	9
ZOOLOGY: Bi 341; Z 371,345	12
MICROBIOLOGY: Mb 304	5
Recommended electives: Ch 226,227; BB 350	
	29–31

Integrated Science

PHYSICAL SCIENCE: Ph 204,205,206; Ch 340	9–12
EARTH SCIENCE: G 204,205,206,331, 352; Ats 300; Oc 331	9–12
BIOLOGICAL SCIENCE: Bot 331,341, 371; Bi 341,370,371; GS 331	9–12
	27–30

Earth Science

Ats 300, 492 or 433; Ph 204, 205, 206; G 312, 313; Oc 331; G 322 29–33
Recommended elective: Sls 100

Physical Science—Chemistry Option

Ch 334,335,336; Ch 423,424,425 or 440,441,442; 6 hrs upper division chemistry lab; 3-5 hours from Ch 320, 419, 428,450 or 418, or BB 350,461 26–28

Physical Science—Physics Option

Ph 311,312,313; Ph 471,472,473 or 474, 475,476; BB 461,462; Ph 430; or other approved upper division electives; required mathematics 27–30

MATHEMATICS COMMON CORE

Required of all prospective mathematics teachers

GS 101,102,103	12
Ph 201,202,203 or 211,212,213	12

MATHEMATICS TEACHING NORM AREA

Analysis, Mth 111,112,113,211	16
Geometry, Mth 332 and 333 or 493	6
Abstract Algebra, Mth 347,348,241,341, 342,346 (any 4)	12
Computer Science, CS 211	4
Statistics-Probability, Mth 361; St 311,312	9
Recommended upper division electives: Mth 491,492,362,363,494,495,496 or other courses in algebra or geometry	9
	56

Social Studies

For recommended course of study, consult social studies adviser.

Hist of Western Civ (Hst 101,102,103)	9
Hist of Amer Civ (Hst 224,225,226)	9
Introductory Geog (Geog 105,106,107)	9
Principles of Econ (Ec 201,202, or 203)	6
Amer Governments (PS 201,202, or 203)	6
General Sociology (Soc 204,205, or 206) or Cultural Anthropology (Anth 207,208)	6
Seminar (SSc 407)	6
Upper division history electives	9
Social science electives, at least 6 of which must be upper division hours. No more than 6 may be in history	15
	75

Speech Communication

Each major in education intending to teach speech communication or pursue an educational specialist certificate in speech correction should consult an adviser in the Department of Speech Communication. Through consultation with an adviser, competency-based, individualized programs will be developed. Course selection and extracurricular activities will depend upon previous experiences, present knowledge and interests, and future goals. Areas of concentration include general oral communication; theater arts; public, group, and interpersonal communication; broadcast media communication; and speech communication sciences and disorders.

Speech Communication Education Core: 35 hours in the following courses: Sp 111,112, 120,121,147,201,202,262,370,414,420.

OPTIONS

General Speech Communication: 33-35 hours in the following courses: Sp 113,122,244,247, 248,250,275,350,354; two of the following three courses: Sp 231,321,323.

Theater Arts: 24 hours in the following courses: Sp 122,244,245,247,248,250/350,346,354.

Public, Group, and Interpersonal Communication: 24 hours in the following courses: Sp 113,231,250/350,275,321,322,323,327.

Broadcast Media Communication: 24 hours in the following courses: Sp 160,250/350,362, 363,367,467,451; approved elective.

Speech Correction: Reduced core of five courses (17 hours): Sp 111,201,202,370, and 420; 16 professional courses in *speech* and *hearing* (49 hours), including Sp 371,481,482,483, 484,485,486,487,488, 489, 490, 491, 492, and practicum

UNDERGRADUATE COURSES

Education

Lower Division Courses

Ed 50 Reading Improvement
3 hours 3 ①
Reading in different content areas with individual instruction. Emphasis on vocabulary, comprehension, and word recognition skills as well as on oral reading and locating information. Close attention to individual reading problems of each student.

Ed 59 Methods of Study
3 hours 3 ①
Development of skills and habits essential to effective learning. Specific methods applied to various subject-matter fields; taking and using notes; preparation for tests and examination-taking skills, study schedule, use of the library, preparing study sheets, underlining textbooks effectively, using auxiliary materials, fixing study habits. Knwledge and skills applied to the demands of an actual university course.

Ed 111 Contemporary Education
2 hours 2 ①
Exploration of trends and educational practices in today's schools.

Ed 199 Special Studies
Terms and hours to be arranged

Ed 210 Theory and Practicum: Field
6 hours
First of a two-term sequence. Students assigned to a public school on a half-day basis to develop competencies in the social, psychological, and cultural foundations of education. Teaching strategies, including the teaching of reading and operation of media equipment; classroom operation. Prerequisite: Psy 200. Enrollment limited.

Ed 296 Leadership Training
2 hours 2 ①
Interpretation of leadership, understanding functions of group, possible methods involved; leadership in campus life as laboratory experience. Prerequisite: an actual leadership position. If students have not held such position, consent of instructor required.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (G) may be taken for graduate credit.

Ed 310 School in American Life
3 hours 3 ①
Elementary and high schools from standpoint of teacher; aims, functions, and characteristics. Prerequisite: Psy 201,202; two weeks of scheduled observation in the public schools in September to be arranged the preceding April; and admission to the teaching credential program.

Ed 311 Theory and Practicum: Campus
6 hours 2 ② 2 ②
A campus-based course for the in-depth development of the concepts introduced in Ed 210, and to be taken during the term immediately following.

Ed 312
Educational Psychology: Learning
3 hours 3 ①
Laws of learning and application to classroom; motivation; transfer of training; memory; forgetting; psychology of school subjects. Prerequisite: Psy 200.

Ed 313 Theory and Practicum: Field
6 hours
A field-based course designed to develop competency in understanding the adolescent: his life roles, maturation, characteristics, and factors influencing his development; in developing objectives, diagnostic and prescriptive techniques, teaching strategies, and use of educational media.

Ed 350 Methods in Reading: Elementary and Secondary
3 hours 3 ①
Prerequisite: Ed 312; junior standing.

Ed 367
Theory and Practicum: Elementary
7-15 hours 1 ⑦ 4 ⑥
Basic instructional strategies: skill development, concept formation, inquiry, simulation, reading, and media. Emphasis on diagnosis, prescription, and evaluation in basic subject areas (language arts, mathematics, science, and social studies), integrating substantive knowledge and classroom application. Continued development of content in Ed 210 and 311. May be repeated for a maximum of 15 hours. Prerequisite: Ed 210, 311, 350E, 406 (Reading). To be graded in blocks: 8 hours of field practicum (P/N grading) and 7 hours of lecture (regular grading).

Ed 401 Research

Ed 402 Independent Study

Ed 405 Reading and Conference

Ed 406 Projects
Terms and hours to be arranged

Ed 407 Seminar
1,2, or 3 hours any term. 1, 2, 3 ①
Prerequisite: Ed 210,311,350,408. If students have not had prerequisite, they must have consent of instructor.

Ed 408 Special Secondary Methods
3 hours
Problems and methods in selecting and organizing materials for instruction; comparison and evaluation of methods, laboratory techniques, supplies, equipment; economy of time and materials. Sections include: (a) agriculture, (b) biological science, (c) business, (d) home economics, (e) industrial arts, (f) mathematics, (g) physical science, (h) physical education, (i) health education, (j) English, (k) social science, (l) junior high school science, (m) modern languages, (n) art, (o) music, (p) journalism, (s) speech, (t) trade and industrial education. Prerequisite: Ed 210,311,350. (6 hours maximum allowed toward certification.) Ed 350 prerequisite or concurrent.

Ed 414 Student Teaching: Kindergarten
3 hours
Open only to students in Elementary Education. Prerequisite: Ed 415 (Elementary) minimum of 6 term hours; Ed 450, Kindergarten Education; and consent of adviser. Arrangements to do student teaching must be made during registration for winter term of junior year.

Ed 415 Theory and Practicum: Elementary Student Teaching
12 to 15 hours
Open only to students in Elementary Education. Senior standing in Elementary Education and consent of instructor required. Student must not be on probation. Corequisite: Ed 407.

Ed 416 Theory and Practicum: Secondary Student Teaching
12 to 15 hours
A full-time experience in a secondary school in the student's field of preparation and interest: (a) agriculture, (b) biological science, (c) business, (d) home economics, (e) industrial arts, (f) mathematics, (g) physical science, (h) physical education, (i) health education, (j) English, (k) social science, (l) junior high school science, (m) modern language, (n) art, (o) music, (p) journalism, (s) speech communication, (t) trade and industrial education. Corequisite: Ed 407.

Agricultural Education

Lower Division Course

AEd 199 Special Studies
Terms and hours to be arranged

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

AEd 401 Research
Terms and hours to be arranged

AEd 405 Reading and Conference
Terms and hours to be arranged

AEd 407 Seminar
Terms and hours to be arranged

Ed 408 Special Secondary Methods
3 hours
Section 1: Supervised Farming, FFA. *Section 2:* Shop and Manipulative Skills.

AEd 411 Program Report Analysis
2 hours fall or spring 2 ①
Federal, State, and local reports and records prepared by the Vocational Agriculture Teacher.

Business and Distributive Education

Upper Division Courses

BEd 401 Research
Terms and hours to be arranged

BEd 403 Thesis
Terms and hours to be arranged

BEd 405 Reading and Conference
Terms and hours to be arranged

BEd 407 Seminar
Terms and hours to be arranged

Home Economics Education

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

HEd 401 Research
Terms and hours to be arranged

HEd 403 Thesis
Terms and hours to be arranged

HEd 405 Reading and Conference
Terms and hours to be arranged

HEd 406 Projects
Terms and hours to be arranged

HEd 407 Seminar
Terms and hours to be arranged
PLANNED HOME EXPERIENCES.
PROBLEMS OF BEGINNING TEACHERS.

Ed 408 Special Secondary Methods
3 hours

Industrial Arts Education

Lower Division Courses

IA 130,131,132
Introduction to Technologies
5 hours each term 2 ① 3 ②
The four function-based technologies and occupations within them; commonalities among technologies, functions and processes, teacher responsibilities and preparation.

IA 217 Technical Design
5 hours 2 ② 3 ②
The technical-industrial design process. Statement of a design problem and application of design process to the solution.

IA 221,222,223
Laboratory Technical Aids
3 hours each term 1 ① 2 ②
Special techniques and procedures for implementing effective laboratory instruction. Participation in planning, supervision, demonstrations, evaluation, equipment maintenance, supply ordering, and other elements of laboratory instruction.

IA 252,253,254
Graphic Communications
4 hours each term 1 ① 3 ②
Understandings and skills related to the major concepts of graphic communications and the communication industry as utilized in the functional divisions of graphic arts, photography, drafting, and design industries. Occupational expectations for specific jobs.

IA 271,272 Electricity-Electronics
4 hours each term 1 ① 3 ②
Major concepts of power generation, electrical control, communication, measurement, and industrial electrical applications.

IEd 281
Foundations of Industrial Education
3 hours 3 ①
Contemporary programs, and relation of industrial teacher to the total educational enterprise.

IEd 282 Occupational Analysis and Curriculum Development
3 hours 3 ①
Professional education experiences for industrial education teachers.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

IEd 311,312
Elementary School Industrial Arts
3 hours each term 3 ①
Objectives, methods, techniques of *expressional* industrial arts in elementary schools. *First term:* Objectives and techniques, group projects in home room, creative expression. *Second term:* Individual projects for special displays, tools and material for special-subjects room. Prerequisite: Ed 310 or junior standing.

IA 335
Industrial Applications Laboratory
3 hours 2 ① 1 ③
Experimental adaptation of industrial procedures, materials, and processes to meet industrial arts instructional needs. Instructional procedures, materials, and devices that reflect and interpret modern technology. Prerequisite: junior standing.

IA 341,342,343 Mechanical Power
4 hours each term 4 ②
Concepts of power development and transmission, occupational aspects and sociological influences of power technology.

IA 352,353,354
Graphic Communications
3 hours each term 2 ① 1 ③
Major and subconcepts of the integrated divisions with group and individual experiences in photography, design, drafting, and graphic arts using a function-concept organization. Prerequisite: IA 254.

IA 371 Applied Electricity
4 hours 1 ① 3 ②
Fundamentals of electricity; theory and laws for direct current and alternating circuits; generation, distribution A.C. power; principles of electric motors; application of theory to practical problems; use of test procedures; electrical components; construction techniques. For industrial arts instructors who teach applied electricity courses in secondary schools.

IA 372,373,374 Applied Electronics
4 hours each term 1 ① 3 ②
Basic electronics, electronic communication circuits, and elements of electronic control; practical application; electronic concepts laboratory experiments, and construction of electronic devices. Prerequisite: IA 371.

IA 381,382,383 Materials-Processes
4 hours each term 4 ②
Major and subconcepts with group and individual experiences to develop specialization in two of the following: woods, plastics, ceramics, and metals, using a function-concept organization. Prerequisite: IA 283.

IEd 401 Research
IEd 403 Thesis
IEd 405 Reading and Conference
IA 406 Projects
IEd 407 Seminar
IA 408 Workshop
Terms and hours to be arranged

IEd 420 Industrial Education Organization and Management (g)
3 hours 3 ①
Goals and objectives, course organizational procedures, management strategies, and physical setting for the fully functioning laboratory and instructional environment. Prerequisite: Ed 408e; senior standing.

IEd 474 Industrial Arts for the Intermediate Grades (G)
3 hours 3 ①
Scope and sequence of industrial arts curricula. Organization, content, methods, applied learning experiences, materials, and physical setting. Prerequisite: senior standing, teaching experience in industrial arts.

IEd 475 Project Selection and Analysis
(G) 3 hours 3 ①
Projects for use in teaching industrial arts based on objectives, processes, and function. Prerequisite: IEd 472 or equivalent.

Science Education

Lower Division Course

SEd 266 Environmental Education
3 hours 3 ①
Acquaintance with the basic concepts with special attention to the meaning, scope, value, and philosophical foundations. Field trips required.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

SEd 365 Environmental Education Practicum
3 hours 3 ①
Planning, conducting, and evaluating field experiences. Prerequisite: SEd 266.

SEd 401 Research
SEd 403 Thesis
SEd 405 Reading and Conference
SEd 407 Seminar
Terms and hours to be arranged

Ed 408 Special Secondary Methods
3 hours
(b) Biological science. (f) Mathematics. (g) Physical science. See Ed 408 under SCHOOL OF EDUCATION.

SEd 465 Administration of Environmental Education
3 hours 3 ①
Directed toward preparation for camp administration. Prerequisite: RR 263 or camp counseling experience.

Vocational Education

Upper Division Courses

VEd 300 Career Education
2-4 hours each term
1 ① 1 ① or 1 ① 1 ② or 1 ① 1 ② to be arranged
Common competencies needed by students preparing to work in career and vocational education in the public schools and community colleges. Individualizes the student's program and enables him to establish personal and professional goals for becoming an effective and creative teacher.

Division of Graduate Studies in Education

WILLIAM R. FIELDER, Division Director

Master's and Doctor's Degree Programs
Education: Edwin Anderson, Coordinator
College Student Services Administration: Jo Anne Trow, Coordinator
Counseling and Guidance: Glenn Clark, Coordinator
Science Education: Tom Evans, Coordinator
Vocational Education: Wayne Courtney, Coordinator

Master's Degree Programs
Adult Education: Isabella McQuesten, Coordinator
Agricultural Education: Phil Davis, Coordinator
Business and Distributive Education: Fred Winger, Coordinator
Health Education: Gordon Anderson, Coordinator
Home Economics Education: Sylvia Lee, Coordinator
Industrial Education: Pat Atteberry, Coordinator
Remedial Reading: Kenneth Ahrendt, Coordinator

Minor Programs
College and University Teaching: Stanley Williamson, Coordinator
Physical Education: Robert Bergstrom, Coordinator

The School of Education offers non-degree programs designed to meet State Board of Education certification requirements (fifth-year) and degree programs (Master's and Doctorate). Work applicable to most programs is available during the academic year and/or summer term. Some programs require residency during the regular academic year.

Standard Teaching Certificate Programs

Nondegree programs offer upper division and graduate courses which satisfy the fifth-year (45 term hours) standard certification requirements for elementary teachers (K-9) and secondary teachers (5-12). Oregon rules for certification require secondary school teachers to have a fifth-year (optional for elementary teachers) and qualification in one of two endorsement areas: Intermediate endorsement (grades 5-9) or senior high school endorsement (grades 9-12) with each requiring demonstrated competency or 15 term hours in specified professional areas. Normally, a minimum of 21 hours is required in the major norm area (subject taught) in the Oregon State University program.

Programs leading to the standard certificate (nondegree or degree) are available in the following areas:

ELEMENTARY EDUCATION

The standard certificate (fifth-year program in elementary education) at Oregon State University requires a minimum program of 45 hours planned with an adviser in elementary education subsequent to the basic certificate program. All work must be upper division or graduate level. The program does not necessarily coincide with a master's degree program, but if the student meets graduate admission requirements it usually can be made to do so. The program should be prepared early to avoid making mistakes and taking unnecessary courses.

The program must include specific requirements in elementary education and enough hours to meet requirements in the standard certificate subject matter areas.

SECONDARY EDUCATION

A program for a Standard Certificate requires 45 term hours planned with an adviser, subsequent to completion of the Basic Norm. All work must be upper division or graduate level. The program does not necessarily coincide with a master's degree program, but if the student meets graduate admission requirements it usually can be made to do so.

Requirements include up to 15 hours in education (to complete the Standard Norm for secondary education) and 21-30 term hours in the student's teaching field (to complete the Standard Norm in the teaching field).

Requirements in education for the Intermediate Endorsement (grades 5-9) are: (1) completion of all basic certificate requirements; (2) counseling and guidance; (3) occupational awareness and career decision making; (4) junior high school or middle school curricula.

NOTE: The requirement for the teaching field Standard Norm for a Standard Secondary Certificate with Intermediate Endorsement may be met by completion of one of the Standard Norms listed below, or by completion of two Basic Norms.

The requirements in education for the Senior High School Endorsement (grades 9-12) are: (1) completion of all basic certificate requirements; (2) counseling and guidance; (3) occupational exploration and career decision making; (4) senior high school curriculum.

STANDARD NORMS

Agricultural Education

Basic Norm	70
Subject matter field or fields in agriculture	18
Thesis (AED 503)	6
Education and/or approved electives	21
	115

Business Education

Completion of a Basic Norm.

Required courses in business education: Current trends in typewriting (3), in shorthand (3), in basic business (3), in office procedure (3). Measurements in business education (3), administration and supervision of business education (3), problems and research techniques in business education (3).

Elective courses in business administration and education.

Distributive Education

Completion of a Basic Norm.

Required courses in business education and distributive education: Current trends in distributive education (6), measurements in distributive education (3), administration and supervision of business education and distributive education (3), problems and research techniques in distributive education (3).

English Education

Basic Norm in English	63
Graduate courses to include work in advanced writing or linguistics and literary criticism	21
Additional hours, with approval of adviser	9
Education and/or approved electives	15
	108

Health Education

	Hours
Basic Norm in health education	40–52
School Health Administration (H 461)	3
[1] Approved upper division or graduate health courses	15
Education and/or approved electives	30
	85–100

Home Economics Education

Students may take any of these courses any time within their 5-year programs. With approval of the Home Economics Education Department, any of these courses which carry graduate credit or equivalent graduate courses may be submitted as a part of a program for a master's degree.

Family Nutrition (FN 325)	2
Advanced family relations course	3
Consumer Economics (HM 412)	3
Seminar: Home Economics Role in Society (HEc 407)	1
House Planning in Relation to Function (HM 335), Socio-Psychological Aspects of Clothing (CT 515), Flat Pattern and Draping (CT 310), or Tailoring (CT 312) if no more than six hours of clothing construction have been taken	3
	12

[1] Credit for H 401, 403, 405, 406, 407, or 408, singly or combined, cannot exceed 9 term hours for master's degree programs.

Industrial Education

Basic Norm	70
Hist Perspect of Ind Ed (IEd 570)	3
Electives (industrial education)	6
Facilities Design for Ind Ed (IA 511)	3
Technical subjects to build area of subject matter specialization, based on undergraduate preparation	18
Education and/or approved electives	15
	115

Trade and Industrial Education

Basic Norm	83
21 hours from the following:	
Instructional Materials (IEd 482), 3	
Occupational Analysis (VEd 472), 3	
Safety in Industrial Education (IEd 477), 3	
Cluster Career Programs (VEd 479), 3	
Cooperative Programs (VEd 483), 3	
Coord of Ind Ed Programs (IEd 484), 3	
Public Relations for Teachers (VEd 487), 3	
The Community College (Ed 550), 3	
Mgmt of Industrial Ed (IEd 576), 3	21
24 hours of Education and/or approved electives from:	
Ind Ed Organization and Mgmt (IEd 420), 3	
Audio-Visual Aids (Ed 436), 3	
Facilities Design for Ind Ed (IA 511), 3	
Tests and Measurements (Ed 532), 3	
Prin and Obj of Voc Ed (Ed 494), 3	
Org and Admin of Voc Ed (Ed 495), 3	24
	128

Language Arts-Social Studies

Basic Norm in language arts-social studies	81
Advanced writing, linguistics, and other language arts	21
Upper division and graduate courses in history	9
Other upper division and graduate courses in social studies	3
Education and/or approved electives	12
	126

Students in this norm have joint advisers in English and social studies, must take Ed 408, Special Secondary Methods, in both English and social studies, and do student teaching in both areas supervised by both departments.

Physical Education

Basic norm in physical education	77
PE 446,449,456	9
[1] Approved upper division or graduate physical education courses	12
Education and/or approved electives	24
	122

[1] Credit for PE 401, 405, 406, 407, or 408, singly or combined, cannot exceed 9 term hours for master's degree programs.

Science and Mathematics Education

Integrated Science

	Hours
Basic Norm (all required science and mathematics)	70–80
Approved upper division and/or graduate courses in science	21–30
Science education and education	15
	106–125

Biology

Basic Norm (all required science and mathematics)	75–83
Approved upper division and/or graduate courses in science	21–30
Science education and education	15
	111

Physical Science—Chemistry Option

Basic Norm (all required science and mathematics)	77–79
Approved upper division and/or graduate courses in science	21–30
Science education and education	15
	113-124

Earth Science

Basic Norm (all required science and mathematics)	78-81
Approved upper division and/or graduate courses in science	21-30
Science education and education	15
	111-128

Mathematics

Basic Norm (all required science and mathematics)	71
Approved upper division and/or graduate courses in mathematics	21-30
Science education and education	15
	107-116

Physical Science—Physics Option

Basic Norm (all required science and mathematics)	78-81
Approved upper division and/or graduate courses in science	21-30
Science education and education	15
	114-126

Social Science Education

Basic Norm in social studies	75
Required upper division or graduate courses in history	9-12
Required upper division or graduate courses in history, geography, sociology or anthropology, political science, or economics	18-21
Education and/or approved electives	15
	112-123

Master's and Doctor's Degree Programs

Oregon State University offers the Master of Arts (M.A.), Master of Science (M.S.), Master of Education (Ed.M.), Doctor of Education (Ed.D.) and Doctor of Philosophy (Ph.D.) degrees in the areas described on pages 118-120.

COLLEGE STUDENT SERVICES ADMINISTRATION

The College Student Services Administration (CSSA) program offers preparation in college union and student activities administration, residence hall programming and administration, and general student services administration.

The M.S. in Education degree is offered with a major in CSSA. At least one calendar year on campus is required toward the completion of the minimum 54 term hours of academic work.

The Ed.D. or Ph.D. in Education is offered with a major in CSSA and two supporting minors, one of which must be in a substantive field outside of the School of Education. This program is designed for educators who are preparing for leadership roles as directors or deans of student services administration. The candidate must be mature, must have had full-time work experience at the college level or in a related area, and must have a satisfactory academic background. Programs are individualized according to the training, background, experience, and career goals of the candidate. Preference over master's degree candidates is given to promising doctoral candidates.

Assistantships in student services areas are required for both master's degree and doctoral students, except in unusual circumstances.

CSSA COURSES

Ed 555 Student Services in Universities and Community Colleges
4 hours 4 ①
Historical philosophical, and organizational foundations of student personnel services in higher education; student services and student life functions in colleges, universities, and community colleges.

Ed 556 Student Services: Housing Programs and Administration
3 hours 3 ①
Problems and issues in housing students. Residence hall programs, sororities and fraternities, off-campus housing; staffing and administrative patterns; program development; fiscal management and trends.

Ed 557 Student Services Organization and Administration
2 hours 2 ①
Organizational patterns in student personnel administration, staff selection and development, general program development, student involvement, legal aspects.

Ed 558 The Student and the University
3 hours fall 3 ①
The student in relation to the total campus environment. Topics include student characteristics; campus cultures; students' rights, freedoms, and responsibilities; attitudes, expectations, and influences of faculty and administration; and values systems and morality as sources of conflict in higher education. Emphasis on utilization of research reports and investigative techniques.

Ed 584 College Union Administration
3 hours 3 ①
Historical and philosophical study of the college union around the world with special emphasis upon current principles and practices in college union administration in the United States. Prerequisite: Ed 556. Enrollment in CSSA or consent of instructor required.

Ed 585 Student Activities Administration
3 hours 3 ①
Historical and philosophical study of student activities with particular emphasis upon current principles and practices in student activities administration and advising. Prerequisite: Ed 556. Enrollment in CSSA or consent of instructor required.

Ed 587 Practicum in Student Personnel Work in Higher Education
3 hours each term, two terms 3 ①
Supervised practical experience in student personnel areas: general administration, counseling center, financial aids, residence hall programs, student housing, student activities, college union, placement center, international education, and educational opportunities. Student will spend at least one hour a week in a conference or seminar with the agency supervisor or practicum coordinator. Limited to students in the College Student Services Administration program.

GENERAL EDUCATION

In this program emphasis may be placed on elementary or secondary curriculum and instruction, foundations of education, or the community college. Programs are individualized according to the training, background, experience, and career goals of the candidate. To qualify for the Ed.D. or Ph.D. degree the candidate must complete the graduate major in education and two graduate minors, with one minor in a substantive field outside the School of Education. (See *Graduate Catalog*)

Community College Faculty Development programs are designed to prepare new career-oriented two-year college faculty in one or more recognized disciplines. A master's degree has become widely recognized as the minimum preparation needed for two-year college instructors in the academic fields. Usually, those who teach vocational and technical subjects are required to have less formal preparation, supplemented by substantial practical experience.

Graduate programs to meet the requirements for an Ed.M. degree or for a minor in an Ed.D. or Ph.D. degree emphasize a multidisciplinary approach to graduate study, since the educational objectives of two-year college faculty vary from those of traditional graduate students.

GENERAL EDUCATION COURSES

Ed 424 Measurement in Education
(G) 3 hours 3 ①
Standard tests and scales; statistical method. Prerequisite: senior standing.

Ed 429 Principles of Remedial Education (G)
3 hours 3 ①
Extreme school learning problems; underachievement; diagnosis and remediation, diagnostic instruments and remedial resources. Applies to both elementary and secondary education. Prerequisite: Ed 350; senior standing.

Ed 430 The Junior High School (G)
3 hours 3 ①
Development and program as it relates to total educational system and to social and educational needs of adolescent youth. Emphasis given to changing patterns of junior high school in terms of cultural needs and developments. Prerequisite: senior standing.

Ed 431 Junior High School Curriculum (G)
3 hours 3 ①
Curriculum needs of junior high school pupil; scheduling core program, instructional materials in relation to ability and maturity of pupil. Prerequisite: senior standing.

Ed 435 Audio-Visual Aids (G)
3 hours 1 ① 2 ②
Film, slide, chart, and other visual materials; operation of projectors and other equipment.

Ed 436 Preparation of Audio-Visual Aids (G)
3 hours 1 ① 2 ②
Aids for more efficient teaching in large and diversified classes; charts, graphs, illustrated materials, flat and three-dimensional materials for display or projection; audio-teaching aids.

Ed 439 The Gifted Child (G)
3 hours 3 ①
Psychology, education, and guidance of the mentally superior and the extraordinarily gifted child. Senior standing required.

Ed 450 Kindergarten Education (G)
3 hours 3 ①
Building good attitudes toward school; group adjustment, work habits, readiness for first-grade subjects. Prerequisite: Ed 350; student teaching. Elementary education majors only.

Ed 460 Psychology of Childhood
(G) 3 hours 3 ①
Behavior during the prenatal period, infancy, and childhood; muscular activities, perception, emotional adjustment, intelligence, language, and social behavior. Prerequisite: senior standing.

Ed 461 Psychology of Adolescence
(G) 3 hours 3 ①
Behavior changes during preadolescence and adolescence as related to physiological development and social and cultural factors. Emphasis on personal and social adjustment. Prerequisite: senior standing.

Ed 463 The Maladjusted Child (G)
3 hours 3 ①
Discovery and treatment; home, school, and community in relation to child's mental health. Prerequisite: senior standing in education.

Ed 464 The Mentally Retarded Child
(G) 3 hours 3 ①
Psychology, education, and guidance of the mentally retarded child. Prerequisite: senior standing in education.

Ed 465 Diagnostic and Corrective Techniques in the Basic Skills (G)
3 hours 3 ①
Diagnostic, remedial, and corrective techniques in basic skills exclusive of reading. Prerequisite: senior standing in education.

Ed 470 Education of the Exceptional Child (G)
3 hours 3 ①
The emotionally disturbed, the mentally accelerated, the slow learner, and the physically handicapped. Visits are made to state institutions and agencies to acquaint students with service available. Prerequisite: senior standing.

Ed 476 The Teacher and the Law (G)
3 hours 2 ①
For teachers and administrators concerned with the law as it relates to problems in education. Prerequisite: junior standing.

Ed 501 Research
Terms and hours to be arranged
In addition to regular courses listed, members of the staff supervise research and investigation by qualified graduate students. Registration by permission of staff members. Prerequisite: graduate standing in education. See also AEd 501, BEd 501, HEd 501, IEd 501, SEd 501.

Ed 503 Thesis

Ed 505 Reading and Conference

Ed 506 Projects

Ed 507 Seminar

Ed 508 Workshop
Terms and hours to be arranged

Ed 511 Recent Educational Trends and Problems
3 hours 3 ①
Trends, problems, and developments in all fields of education. Prerequisite: 24 hours of upper division education including student teaching.

Ed 512
Research Procedures in Education
3 hours 3 ①
Methods, techniques, and tools; scientific method; locating and formulating problems; solving problems; necessary statistical tools; collection and interpretation of data; preparing research reports.

Ed 522 Secondary School Curriculum
3 hours 3 ①
Study of the basic structure of the secondary school curriculum and the process of reconstruction as related to social and cultural change and need. Consideration also given to the extra-curricular program.

Ed 524 Construction and Use of Objective Examinations
3 hours 3 ①
Selection of test items; types of examinations; validity; administering, scoring, grouping results.

Ed 527 Secondary School Administration and Supervision
3 hours 3 ①
Emphasis on the important principles of secondary school administration and supervision and on involving faculty, students, and parents in the work of the school. Attention given to ways of improving the total curricular program.

Ed 532 Tests and Measurements
3 hours 3 ①
Selected tests and measurements applicable in a particular subject or department. Prerequisite: Ed 424 and other courses specified by department.

Ed 543 History of American Education
3 hours 3 ①
Intellectual developments with special reference to education.

Ed 550 The Community College
3 hours 3 ①
Community college movement; aims and functions, curriculum, and organization; relation to secondary and higher education.

Ed 551
Community College Curriculum
3 hours 3 ①
Curriculum as related to function of community junior college; transfer, terminal, vocational, and adult education programs; research and firsthand evaluation of community junior college curricula. Prerequisite: graduate standing; Ed 550 or community college experience.

Ed 552 Administration and Supervision of the Community College
3 hours 3 ①
Campus planning; budget and finance; board relations; community involvement; administrative organization; personnel relations; program development. Prerequisite: Ed 550 or community college experience.

Ed 553 Elementary School Curriculum
4 hours 4 ①
Pupil needs in life situations, objectives, essentials of a goal program, varying curriculum designs, organization of learning experiences, evaluation of learning, appraisal of new curriculum practices. Prerequisite: elementary certification; one year of elementary teaching.

Ed 554 Elementary School Supervision and Administration
4 hours 4 ①
Role, duties, needs, problems; evaluation and improvement of teaching-learning. Prerequisite: elementary certification; one year of elementary teaching experience.

Ed 561
Advanced Educational Psychology
3 hours 3 ①
Experimental material that seems most useful and relevant to educational psychology. Prerequisite: graduate standing in education.

Ed 566 Curriculum Construction
3 hours 3 ①
Building elementary and secondary school curricula; theories and policies since 1900, selecting and organizing subject matter, courses of study, curriculum organization. Prerequisite: 24 hours of upper division credit in education including student teaching.

Ed 567 Strategies in Language Arts Instruction in the Elementary School
3 hours 2 ① 1 ②
Role of language arts in elementary school. Objectives; research findings; the teaching of spelling, writing, and speaking-listening skills; new instructional materials and programs; testing and evaluation. Prerequisite: Ed 367; classroom teaching experience.

Ed 568 Strategies in Mathematics Instruction in the Elementary School
3 hours 2 ① 1 ②
For experienced teachers and principals interested in designing new or improving existing mathematics curricula; learning theory, research, and instructional programs with classroom organization and modes of learning; emphasis on design curriculum foundations, theory, and construction rather than on content and materials. Prerequisite: Ed 368; successful elementary teaching experience.

Ed 569 Strategies in Social Science Instruction in the Elementary School
3 hours fall 2 ① 1 ②
Analyzes structure of several social science disciplines; research literature pertaining to social studies instruction. Prerequisite: Ed 367; classroom teaching experience.

Ed 570 Strategies in Science Instruction in Elementary School
3 hours 2 ① 1 ②
Emerging programs in elementary science with emphasis on the interdependence of content and process in scientific inquiry; general, diagnostic, and prescriptive techniques in science instruction.

Ed 574 School Supervision
3 hours 3 ①
Purpose of and plans for supervision; use of tests, diagnosis of pupil difficulty. Prerequisite: elementary or secondary certification; one year of teaching experience.

Ed 575 School Finance
3 hours 3 ①
School finance and business administration; sources of school income, State financial structure, budgeting and accounting. Prerequisite: elementary or secondary certification; one year of teaching experience.

Ed 576 School Buildings
3 hours 3 ①
Problems involved in planning, financing, and construction; care and maintenance; problems of equipment. Includes analysis of problems of a specific district. Prerequisite: elementary or secondary certification; one year of teaching experience.

Ed 597,598,599 Education and Contemporary Trends in Thought
3 hours each term 3 ①
Six major intellectual movements that have formed the ethos for the contemporary period, their impact upon the nature of the educational system of the United States, and their implications for the future. *Ed 597:* Social Darwinism and Nineteenth-Century Scientism; Pragmatism, Pragmaticism, and Instrumentalism. *Ed 598:* Marxism, Freud and Psychoanalytic Thought. *Ed 599:* Science in the Twentieth Century, Existentialism. Limited to twenty-five students each term.

COUNSELING AND GUIDANCE

The counseling and guidance program prepares counselors and supervisors of student personnel services in elementary, secondary, and community college settings.

The doctoral degree is in education with a major in counseling and guidance. In addition to the experience requirements for the master's candidate, the doctoral candidate should have two years of paid counseling experience. Two supporting minors are required, one of which must be outside the School of Education. Programs are individualized according to the training, background, and experience of the candidates and in terms of their career goals.

The master's degree is in education with a major in counseling and guidance. Supporting course work in areas related to guidance and appropriate to candidate's career goal settings is required. A minimum of 57 hours, one-half of which must be in residence, is recommended for this degree and recommendation for certification. Only 21 hours may be transferred from other schools or the Division of Continuing Education. No extension credit may be transferred from another state. All practicum training (Ed 488) must be under the auspices of the Oregon State University School of Education.

Because of limited facilities and availability of settings, Supervised Counseling, Ed 488 and 588, may be offered for the most part during the school year. The counselor in training should arrange to spend a term other than summer term on campus. Candidates are selected by a screening committee made up of counselor education faculty, students, and representatives from state professional organizations and agencies. During training, the student should arrange to review his progress with his adviser, but he is ultimately responsible for seeing that he has met institutional requirements and limitations. A comprehensive examination is required.

The following courses constitute the core program for students majoring in counseling and guidance. Additional courses may be selected from general education or a specialized area depending upon the student's background and experience.

COUNSELING AND GUIDANCE COURSES

Ed 485 Principles and Practices of Guidance Services (G)
3 hours 3 ①
Beginning course in guidance. Overview of guidance and personnel work; vocational, educational, health, social, personality, recreational, and individual development; participation of teachers, counselors, administrators, parents, and community organizations in guidance program. For teachers and administrators. Prerequisite: senior standing.

Ed 486 Occupational and Educational Information (G)
3 hours 3 ①
Materials available; present trends; value and usefulness for high school and college students. Prerequisite: senior standing.

Ed 487 Counseling Techniques (G)
3 hours 3 ①
Development of philosophical concepts, psychological constructs, goals, and methodology basic to counseling theory and practice. Prerequisite: Ed 485 or consent of instructor.

Ed 488 Supervised Counseling (G)
3 to 9 hours
Pre-practicum experience in simulation and micro-counseling as well as actual counseling experience in an appropriate professional counseling setting. Links the theoretical and practical aspects of counseling. Prerequisite: Ed 487. Consent of instructor required.

Ed 577 Counselor Training: Group Procedures
3 hours 3 ①
Principles underlying behavior and methods for modifying individual's attitudes and actions by group procedures; group dynamics, leader's role in group, attitudinal change and its results, group and play therapy, individual and group counseling methods. Prerequisite: Ed 485,487.

Ed 581,582 Counselor Training
3 hours each term 3 ①
Students gain experience in professional counseling settings or settings designed to provide experience in industrial, business, or social milieu.

Ed 588 Supervised Counseling: Advanced
3 hours each term, two terms 3 ①
Provides actual counseling experience in counseling laboratory and in schools or related areas. Ed 487 prerequisite or concurrent.

Ed 589 Organization and Administration of Guidance Services
3 hours 3 ①
Criteria for evaluating present personnel services, setting up guidance committees, selection of personnel, responsibilities and duties of staff, development of program of services, and in-service training program. Prerequisite: Ed 485, 487.

In addition to the hours listed above, electives for the remaining hours should be selected with the aid of the adviser from courses which will help the individual to function in his career setting.

SCIENCE EDUCATION

The M.S., M.A., and Ed.M. degrees can be earned through the Department of Science Education. The *Master of Science in Science Education* is the one most commonly sought. It is designed for junior and senior high school science and mathematics teachers. The student must complete 45 term hours of approved graduate courses. Thirty hours must be in departmental science fields, and of these at least nine term hours must be in each of two separate science departments. The minor of fifteen hours must include a minimum of nine hours from the Department of Science Education. The degree is considered terminal when special courses designed for science teachers predominate in the program. The curriculum may be completed during the academic year or during summer sessions.

The doctorate (Ph.D. or Ed.D.) in science education is designed primarily for specialists in science and mathematics education who anticipate work at the elementary or secondary school levels in supervision, in teacher education, or in related pursuits. It requires a major and two minors. The major includes a minimum of 24 hours (including seminars) in the Department of Science Education and 21 hours in professional education courses (to include educational psychology, educational sociology, and educational philosophy). Statistics and a dissertation are required. A language is required for the Ph.D. degree.

SCIENCE EDUCATION COURSES

SEd 465 Administration of Environmental Education (g)
3 hours 3 ①
Planning, supervision, administration, personnel, financing, and evaluation of programs. Prerequisite: SEd 365.

SEd 481 Alcohol Studies in School Curriculum
(G) 3 hours 3 ①
Scientific information about alcohol; physiological, psychological, sociological, and legal aspects of alcoholism. Prerequisite: 24 hours of upper division education.

SEd 501 Research
Terms and hours to be arranged

SEd 503 Thesis
Terms and hours to be arranged

SEd 505 Reading and Conference
Terms and hours to be arranged

SEd 507 Seminar
Terms and hours to be arranged

SEd 572 Historical and Psychological Basis for Elementary School Science
3 hours 3 ①
History and nature of elementary school science, with emphasis on modern trends. Prerequisite: Ed 367, equivalent, or consent of instructor; major concentration in science. Alternate summers only.

SEd 581 Practicum in Mathematics
3 hours 3 ①
Advanced methods of teaching mathematics. Emphasis on laboratory and heuristic approaches. Prerequisite: Ed 416; teaching norm in mathematics. Offered summer and winter terms alternately.

SEd 588 Mathematics Curriculum in Secondary Schools
3 hours 3 ①
Current trends. History of these trends and the rationale for the "modern" revolution. Prerequisite: Ed 416; teaching norm in mathematics. Offered alternate years.

SEd 589 Advanced Topics in Mathematics Education
3 hours 3 ①
Current issues in mathematics education. Extensive use of bibliographies. Prerequisite: SEd 588, 593. Offered alternate years.

SEd 591 Practicum in Biological Science
3 hours 2 ① 1 ②
Laboratory and demonstrative skills, program planning, maintaining and designing laboratory materials. Prerequisite: Ed 408b, Ed 416, and teaching major in biological science.

SEd 592 Practicum in Physical Science
3 hours 2 ① 1 ②
Laboratory and demonstration skills, program planning, maintaining and designing laboratory materials. Prerequisite: Ed 408g, Ed 416, and teaching major or minor in physical science.

SEd 595 Evaluation Techniques
3 hours 3 ①
Trends, practices, and techniques with emphasis on construction of tests, rating scales, check lists, and development of criteria for analysis of student work product. Prerequisite: Ed 408b, g, or f, Ed 416, and teaching experience.

SEd 597 Administration and Supervision of Programs
3 hours 3 ①
Purposes, problems, and procedures for science education programs; individual problems studied. Prerequisite: Ed 408b, g, or f, Ed 416, and teaching experience.

SEd 598 Science Curriculum in Secondary Schools
3 hours 3 ①
Trends, problems, and procedures in junior high and secondary school. Prerequisite: 24 hours of upper division education including Ed 416.

VOCATIONAL EDUCATION

The courses offered in an across-the-board program designed for teachers, coordinators, and directors of careers-oriented programs are listed here.

A one-year internship on the graduate level prepares students for positions of leadership in Vocational Education.

VOCATIONAL EDUCATION COURSES

VEd 472 Occupational Analysis (G)
3 hours 3 ①
Industries, occupations, trades; jobs developed into component parts for instructional use. Teaching units derived through analysis. Prerequisite: Ed 408e.

VEd 483 Cooperative Programs (g)
3 hours 3 ①
Principles, practices, and problems; work experience, work observation, general work experience, work-study, intern program, apprenticeship, diversified occupations; distributive occupations at the secondary, community college, and university levels.

VEd 487 Public Relations for Teachers (G)
3 hours 3 ①
Industrial, civic, and labor organizations; techniques to promote wholesome relationships with community and outside groups. Prerequisite: Ed 408 or teaching experience.

Ed 492 Career Clusters (G)
3 hours 1 ③
Occupational education experiences in the schools. Recent developments in career education, orientation, and exploratory programs. Prerequisite: senior standing.

Ed 494 Principles and Objectives of Vocational Education (G)
3 hours 3 ①
Basic principles and development, history and legislation; vocational schools and vocational programs in relationship to the total educational program. Consent of instructor required.

Ed 495 Organization and Administration of Vocational Education
(G) 3 hours 3 ①
Federal vocational education acts; state boards; local boards; laws, regulations, policies; problems and principles as related to organization, administration, cooperating personnel, agencies, finances, budgets and committees. Consent of instructor required.

VEd 516 Teacher Education in Vocational Education
2-5 hours
Opportunity for educators with specialized preparation to identify and analyze facets of vocational education programming through campus and field experiences. Philosophy, objectives, current issues and problems; criteria for evaluation; cooperative programs; youth organization; research in a specific area; administration. May be repeated for maximum of 15 hours of credit.

Ed 533 Psychological-Sociological Aspects of Vocations
3 hours 3 ①
Choice of occupations; adjusting, or aiding others in adjusting; alteration of occupational conditions and demand to meet needs. Prerequisite: graduate standing in education.

Ed 546
Philosophy of Vocational Education
3 hours 3 ①
Relationship of vocational, technical, and special education to general education and philosophy; concept of work, effect of Industrial Revolution; man's quest for dignity and work in a democratic and technological society.

Ed 547 Cooperative Programs in Vocational Education
3 hours 3 ①
Principles of cooperative education and factors leading to such emphasis in vocational education. Analysis of cooperative programs in vocational education.

Master's Degree Programs

The M.A., M.S., and Ed.M. degrees are available with a major in the following areas: adult education, agricultural education, business education, health education, home economics education, industrial education, and reading.

ADULT EDUCATION

Preparation for teaching and leadership positions in the rapidly growing level of Adult Education is provided by a Master of Education program which includes basic courses in several aspects of adult education and directed field experience. This core of courses may be incorporated into a doctoral program.

ADULT EDUCATION COURSES

Ed 496 Education for Adults (G)
3 hours 3 ①
A general overview of the nature, extent, and significance of adult education; historical development in the U.S. and abroad; the nature of adult groups, institutions, agencies, and programs; the literature of adult education. Prerequisite: senior standing.

Ed 497 Adult Development (G)
3 hours 3 ①
Social scientific literature contributing to a better understanding of human development during the adult years. Prerequisite: 9 hours of upper division behavioral science.

Ed 498
Field Experience in Adult Education
(G) 1-4 hours to arrange
A directed practicum in which student observes, assists, and evaluates adult education activities under the direction of an administrator, teacher, or researcher. Prerequisite or concurrent: Ed 496 or Ed 497.

Ed 595 Leadership Development for Adult and Community Education
3 hours 3 ①
Adult education and basic career expectations in community education. Understanding of leadership roles in this area of educational planning. Prerequisite: Ed 496 or recent experience in some area of adult education.

Ed 596
Program Design for Adult Education
3 hours 3 ①
Problems, coordination, and implementation of adult education programs; situations, objectives, content and instructional resources, promotion, and evaluation. Prerequisite: Ed 496,497 or recent experience in adult education.

AGRICULTURAL EDUCATION

The Department of Agricultural Education, a joint department within the Schools of Agriculture and Education, trains teachers and supervisors of agriculture for secondary schools and for schools and classes of adult farmers and young men not enrolled in regular day schools.

The master's degree in Agricultural Education is offered by this department.

AGRICULTURAL EDUCATION COURSES

AEd 417 The Agricultural Curriculum
(G) 3 hours 3 ①
Course content and types of course organization with reference to objectives to be attained in the field. Prerequisite: Ed 312,416.

AEd 501 Research

AEd 503 Thesis

AE 505 Reading and Conference

AEd 507 Seminar
Terms and hours to be arranged

AEd 516
Extension Course in Teacher Education
Hours to be arranged
Enables present and prospective teachers of agriculture to continue professional improvement; conference, followup instruction, supervision, correspondence, reports. Prerequisite: Ed 210, 311.

AEd 533 Rural Survey Methods
3 hours 1 ③
Technique; analyzing, interpreting, and using results in evaluating and formulating programs; field studies. Prerequisite: Ed 210,311; teaching experience.

AEd 541 Community Programs of Agricultural Education
3 hours 3 ①
Developing the natural and human resources of a community through agricultural education. Prerequisite: Ed 408a; teaching experience.

BUSINESS EDUCATION

The Department of Business Education, a joint department in the School of Business and Technology and the School of Education, offers graduate work leading to the M.A., M.S., and Ed.M. degrees, with a major in the field of business education. Graduate programs may be planned stressing either the basic business/accounting, office occupations, or distributive education areas. The Ed.M. degree is an Option C, no thesis program. The thesis requirement for the M.S. and M.A. degrees is optional.

BUSINESS EDUCATION COURSES

BEd 450
Organization and Administration of Office and Distributive Education (G)
3 hours 3 ①
Organizing and administering vocational office and distributive education programs; development, legislation, and functions within career and vocational education; advisory committees, community survey, and youth organizations; secondary, post-secondary, and adult levels.

BEd 451 Coordination Techniques in Business Education (G)
3 hours 3 ①
Establishing and conducting a functioning relationship between the classroom and on-the-job experiences.

BEd 501 Research
Terms and hours to be arranged

BEd 503 Thesis
Terms and hours to be arranged

BEd 505 Reading and Conference
Terms and hours to be arranged

BEd 507 Seminar
Terms and hours to be arranged
PRACTICUM IN BUSINESS EDUCATION—The planning and development of practical and creative projects, group or individual, in the field of business education. Students will be urged to use actual school situations as nucleus for the term's work and to arrive at the best possible solutions.

BEd 508 Workshop
Terms and hours to be arranged

BEd 536 Problems in Research Techniques in Business Education
3 hours 3 ①
Philosophy and trends in business education; methods and available research studies. Prerequisite: Ed 408 or teaching experience in business subjects.

BEd 537
Measurements in Business Education
3 hours 3 ①
Objectives and principles; testing in specific areas; construction of sample tests; available testing materials; use of tests in diagnostic and remedial teaching. Prerequisite: Ed 408; BEd 536, or teaching experience in business subjects in lieu of Ed 408.

BEd 538
Current Trends in Office Procedure
3 hours 3 ①
Clerical and secretarial procedure programs used in secondary and collegiate schools; course content, teaching methods and materials; organization of laboratories; objectives, standards, instruction sheets, courses of study, and miscellaneous teaching aids. Prerequisite: Ed 408; BEd 536.

BEd 539
Current Trends in Basic Business Subjects
3 hours 3 ①
Analysis and application. Material covered will be useful in teaching related courses at the high school or post-secondary level.

BEd 540 Administration and Supervision of Business Education
3 hours 3 ①
Problems of curriculum, new teachers and orientation, public relations, professional growth and certification, and the use of community resources in administering a business education program.

BEd 541
Current Practices in Typewriting
3 hours fall 3 ①
Principles underlying development of typing skills; motivation, supplementary materials, and special devices. Prerequisite: Ed 408. Students who have not had Ed 408 must have had teaching experience in typing.

BEd 542
Current Practices in Shorthand
3 hours winter 3 ①
Correct writing habits, correlation of sound and symbol response, word and sentence-building, and transcription technique. Prerequisite: Ed 408. Students who have not had Ed 408 must have had teaching experience in stenography.

BEd 543 Selected Topics in Business and Distributive Education
3 hours 3 ①
Current competencies, strategies, and research in some specific teaching area in Business and Distributive Education. May be repeated with different topics a maximum of three times. Prerequisite: Ed 408 or consent of instructor.

Ed 547 Cooperative Programs in Vocational Education
3 hours 3 ①
Principles of cooperative education and factors leading to such emphasis in vocational education. Analysis of cooperative programs in vocational education.

EXTENSION EDUCATION

EXTENSION METHODS COURSES

EM 411 Extension Methods (G)
3 hours winter or spring 3 ①
Organization, scope, and responsibilities of the Extension Service; adult learning; diffusion and communication processes; overview of Extension Methods in agriculture and home economics.

EM 412 Extension Methods (G)
3 hours winter or spring 3 ①
Further explorations into Extension Methods in agriculture and home economics, program planning, and development of skills in selecting and using methods.

EM 453 Field Work in Extension
(g) Terms and hours to be arranged
Field practice in county extension work in agriculture and home economics under supervision of professor of Extension Methods and county extension agents. Prerequisite: EM 411.

EM 505 Reading and Conference
Terms and hours to be arranged
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EM 508 Workshop
Terms and hours to be arranged
To provide special job-related training for Extension workers and others with comparable background. Individual offerings will depend largely on interests and needs of Extension staff, i.e., Program Planning, Resource Development, Educational Methods in Extension, Rural Social Problems. Taught by resident and Extension staff.

HEALTH EDUCATION

The Department of Health offers graduate work leading to the M.A., M.S., or Ed.M. degrees which are granted through the School of Education. Health courses are listed in the catalog under the Division of Health and Physical Education.

HOME ECONOMICS EDUCATION

Professional preparation for teachers of home economics is provided by the Department of Home Economics Education, a joint department of the School of Education and the School of Home Economics.

A program of graduate study leading to a master's degree will be developed to meet individual needs.

HOME ECONOMICS EDUCATION COURSES

HEd 422
Organization and Administration of Homemaking Education (G)
3 hours 3 ①
Organization of homemaking departments with special emphasis on the unique aspects of secondary homemaking. Prerequisite: Ed 408d.

HEd 440 Homemaking Education in the Community High School (G)
Hours to be arranged
Programs of home and family living for extending secondary homemaking departments into school and community. Development of home and family life education at all levels of day-school and adult-education programs under vocational education. Prerequisite: Ed 408d.

HEd 501 Research

HEd 503 Thesis

HEd 505 Reading and Conference
Terms and hours to be arranged

HEd 507 Seminar
Terms and hours to be arranged
HOME AND COMMUNITY EXPERIENCES.
AUDIO-VISUAL AIDS FOR TEACHING HOMEMAKING.
EVALUATION OF HOMEMAKING INSTRUCTION.
STUDIES IN HOME ECONOMICS EDUCATION.

HEd 511 Current Methods in Teaching Homemaking
3 hours 3 ①
Current trends in education applied to homemaking education. Prerequisite: Ed 408d.

HEd 512 Supervision of Home Economics Education
3 hours 3 ①
In-service and preservice home economics supervision. Prerequisite: Ed 408d and teaching experience.

HEd 513 Special Student Groups
3 hours 3 ①
Curriculum programs and teaching methods for the gifted, disadvantaged, handicapped, or mentally retarded child. Prerequisite: Ed 408d.

HEd 514 Curriculum Designs in Home Economics Education
3 hours 3 ①
Curriculum programming emphasizing both useful and gainful aspects of homemaking education; current trends such as flexible scheduling and team teaching, curriculum designs for boys, and coeducational classes in homemaking. Prerequisite: Ed 408d.

HEd 530 Strategies of Instruction in Home Economics
3 hours 3 ①
Applying findings of current research in learning/teaching theory to selected subject areas in home economics. May be taken three times if the subject area being studied is not repeated. Prerequisite: Ed 408d.

HEd 540 Selected Topics in Home Economics Education
1 to 3 hours
Current literature and research on a specific topic of concern to Home Economics Education. May be taken a maximum of three times for credit if specific topic is not repeated. Prerequisite: Ed 408d.

INDUSTRIAL EDUCATION

The Department of Industrial Education offers the M.Ed., M.A., and M.S. degrees with a major in industrial arts.

IEd 420 Industrial Education Organization and Management (g)
3 hours 3 ①
Goals and objectives, course organizational procedures, management strategies, and physical setting for the fully functioning laboratory and instructional environment. Prerequisite: Ed 408e; senior standing.

IEd 474 Industrial Arts for the Intermediate Grades (G)
3 hours 3 ①
Scope and sequence of industrial arts curricula. Organization, content, methods, applied learning experiences, materials, and physical setting. Prerequisite: senior standing; teaching experience in industrial arts.

IEd 475 Project Selection and Analysis
(G) 3 hours 3 ①
Projects for use in teaching industrial arts based on objectives, processes, and function. Prerequisite: IEd 472 or equivalent.

IEd 477
Safety in Industrial Education (G)
3 hours 3 ①
Application of industrial safety procedures in developing safety programs for industrial education laboratory activities. Prerequisite: Ed 408e.

IEd 482 Instructional Materials (g)
3 hours 3 ①
Planning, development, organization, and utilization of instructional materials for industrial education.

IEd 483 Coordination of Diversified Occupations Programs (G)
2 hours 3 ①
Principles and practices; problems involved in organizing, conducting, and reporting a diversified occupations program. Prerequisite: Ed 408.

IEd 484 Coordination of Industrial Education Programs (G)
3 hours 3 ①
The preparation of a teacher-coordinator of industrial education programs, selection and placement of students, relationships with employers, development and teaching related instruction, administration of the program, federal laws related to employment of programs. Organization and administration related to industrial work stations. Student placement and followup and related instruction. Prerequisite: IEd 483.

IEd 490 Industrial Education Laboratory Design and Utilization (g)
3 hours 3 ①
Laboratory design for industrial education technical laboratories. Equipment, budget, and laboratory layout for effective teaching and facility utilization. Development of instructional program-facility relationship. Prerequisite: Ed 408e.

IEd 501 Research

IEd 503 Thesis

IEd 505 Reading and Conference

IA 506 Projects

IEd 507 Seminar

IA 508 Workshop
Terms and hours to be arranged

IA 511
Facilities Design for Industrial Education
3 hours 3 ①
Principles of school laboratory planning for effective instruction in industrial education programs. Design and organization of physical plant for different types of programs and schools. Prerequisite: graduate standing; teaching experience.

IA 521 Selected Technological Units
3 hours summer
Course areas of emphasis may be chosen from: *Electronics, graphic communications, materials-processes, or mechanical power.* Development of technical instructional units through laboratory experiences. Prerequisite: graduate standing and prior experience in the technology. May be repeated for credit.

IA 522
Integration of Technological Units
3 hours summer
Course area of emphasis may be chosen from: *Electronics, graphic communication, materials-processes, or mechanical power.* Laboratory experiences in organizing and integrating units; techniques of program development. Prerequisite: graduate standing and prior experience in the technology. May be repeated for credit.

IA 523
Experimental Laboratory Problems
3 hours summer
Course area of emphasis may be chosen from: *Electronics, graphic communication, materials-processes, or mechanical power.* Content identification, organization, and development of technological experiences. Prerequisite: Prior experience in the technology. May be repeated for credit.

IEd 570 Historical Perspective of Industrial Education
3 hours 3 ①
The evolving concepts, issues, problems, and forces related to the development of education for work. Study of institutions, legislation, and society and their influence on industrial education. Prerequisite: graduate standing.

IEd 573 Course Organization and Management of Integrated Technologies
3 hours 3 ①
The teacher as a classroom-laboratory manager. Responsibilities and problems of planning, organizing, coordinating, directing, and controlling activities in an integrated technology laboratory. Prerequisite: Ed 408e; teaching experience.

IEd 574 Curriculum Practices and Trends in Industrial Education
3 hours 3 ①
Principles underlying curriculum research and development, coordination of industrial education programs, trends in state and national programs, long-range planning and improvement. Prerequisite: graduate standing and teaching experience in industrial education.

IEd 576
Management of Industrial Education
3 hours 3 ①
Functions, techniques of management, supervision principles from teacher's viewpoint; teacher-supervisor relationships. Prerequisite: graduate standing; teaching experience.

REMEDIAL READING

The Remedial Reading program prepares teachers and supervisors in the following areas:

1. Teaching developmental and corrective reading in content areas in elementary and secondary schools and in community colleges.

2. Teaching reading and study skills in two- and four-year colleges.

3. Teaching methods of reading in colleges and universities.

4. Conducting remedial reading clinics.

5. Supervising and administering reading programs and serving as a reading specialist at the elementary, secondary, and community college levels.

For the M.A. or M.S. degree in education with an emphasis on diagnostic, developmental, and remedial reading, supporting course work in areas related to reading and appropriate to career goals is required. It is recommended that the candidate have completed one year of successful teaching experience. A minimum of 50 term hours, 30 of them in residence, is recommended for the master's degree.

Elementary, secondary, and community college teachers with two years of paid classroom experience who complete requirements for an advanced degree are eligible for state certification in extreme learning disabilities exclusive of mental retardation.

If a student does not wish certification, he may, with approval of the department chairman, alter the program to meet his specific needs. An alternative program is available for students who wish to prepare themselves as reading teachers at the community college level.

For a doctorate in education with specialization in remedial reading, the candidate must have had two years of paid teaching experience. Two supporting minors, at least one of them outside of the School of Education, are required. Programs are individualized in accordance with the candidate's background and career goals.

The following courses in remedial reading are offered at the master's degree level.

REMEDIAL READING COURSES

Ed 467 Reading in the Elementary School: Advanced (G)
3 hours 3 ① 1 ①
Seminar and practicum teaching small groups corrective and developmental reading in elementary classrooms. Prerequisite: Ed 350 and teaching experience or student teaching.

Ed 468 Principles and Practices in Remedial Reading (G)
3 hours 3 ①
Review of research on causal factors in reading disability; procedures and materials for correction of reading problems and development of reading skills; organization and administration of remedial programs. Prerequisite: Ed 350.

Ed 469
Diagnostic Techniques in Reading (G)
3 hours 1 ② 1 ①
Lecture-discussion and laboratory; use of standardized tests; construction and use of informal measures for estimating reading achievement and specific needs. Instruction differentiated for elementary, secondary, and college teachers. Prerequisite: Ed 350.

Ed 479 Clinical Practicum in Remedial Reading (G)
3 hours each term, 3 terms 3 ①
Diagnostic tests, remedial techniques in reading, diagnosis, corrective procedures. Consent of instructor required. Prerequisite: Ed 468 and/or Ed 469.

Ed 480
The Psychology of Reading Instruction (G) 3 hours 3 ①
Psychological and physiological aspects and their application to classroom procedure.

Ed 481 Reading in the Secondary School: Advanced (G)
3 hours 3 ①
Practicum and seminar. Teaching small groups of corrective and developmental readers in secondary school classrooms. Prerequisite: Ed 350.

Ed 505 Reading and Conference
3 hours
Topics to be arranged.

Ed 506 Projects
3 hours
These projects in aspects of reading education may be field based and tested in the classroom, and must be approved and arranged by the department.

Ed 507 Seminar
3 hours
Topics which vary by term are: Supervision and Administration of Reading Programs, Methods of Teaching Reading to Adults, Principles and Practices of Teaching Reading in the Community College, and Current Issues in Reading Education.

ENGINEERING

FACULTY

As of January 1974

FREDRICK JOSEPH BURGESS*, M.S., Dean of the School of Engineering; Professor of Civil Engineering; Director, Engineering Experiment Station

JAMES GEORGE KNUDSEN*, Ph.D., Associate Dean of the School of Engineering; Professor of Chemical Engineering; In Charge of Engineering Experiment Station

SOLON ALLEN STONE*, B.S., Assistant Dean of the School of Engineering; Professor of Electrical and Computer Engineering; Head Counselor

PROFESSORS EMERITUS Albert, Feikert, Gleeson, Haith, Harmond, Holcomb, Huber, Martin, Merryfield, Meyer, Paul, Rodgers, Sheely, Sinnard, Slegel, Thomas, Walton*

Agricultural Engineering, Agricultural Engineering Technology: PROFESSORS Davis* (department head), Booster, Cropsey*, Kirk*, Long, Matson, Shearer, Willrich*, Wolfe*
ASSOCIATE PROFESSORS Brooks, Christensen, Miner*, Page
ASSISTANT PROFESSOR Wensink
INSTRUCTOR Tullis

Chemical Engineering: PROFESSORS Wicks (department head), Knudsen*, Levenspiel*, Mrazek*
ASSOCIATE PROFESSORS Elzy, Fitzgerald*, Meredith*

Civil Engineering, Civil Engineering Technology: PROFESSORS Bell*, Burgess*, Laursen*, McClellan*, Phillips*, Pritchett*, Schultz*, Slotta*
ASSOCIATE PROFESSORS Schaumburg* (department head), Bella*, Klingeman*, LaBaun, Layton, Northcraft*, J. Peterson*, Phelps*, Schroeder*, Seaders*, Staton*
ASSISTANT PROFESSORS Montes, Sollitt, White*, Williamson
INSTRUCTORS Craig, Heinecke, Kempner, N. Peterson

Electrical and Computer Engineering, Systems Technology: PROFESSORS Mohler (department head), Engle*, Magnusson*, Short, L. N. Stone*, S. A. Stone*, Weber
ASSOCIATE PROFESSORS Alexander*, Amort*, Herzog, Jensen*, Looney*, Michael*, Oorthuys, Rink, Saugen
ASSISTANT PROFESSORS Adrion, Barton, Bucola, Chang, Osborne, Frick

Engineering Physics: PROFESSOR Boedtker (in charge)

Industrial and General Engineering: PROFESSORS Riggs* (department head), Engésser*, Inoue
ASSOCIATE PROFESSORS Campbell, Gray
ASSISTANT PROFESSORS Croff, Garrard, Love
INSTRUCTORS Hanson, McVivar, West*

Mechanical and Metallurgical Engineering· Mechanical Engineering Technology: PROFESSORS Welty* (department head), Boubel*, Gebhart, Hughes*, Larson*, Mingle*, Nath*, Olleman, Paasche, W. W. Smith*, Thornburgh*, Wilson*, Zaworski*
ASSOCIATE PROFESSORS Bucy*, Dahlke, Davis, Frazier, Johnson*, McMullen, Riesland*, C. E. Smith
ASSISTANT PROFESSORS Kinney*, Reistad*, Thresher*
INSTRUCTORS Bassett, Buskirk

Nuclear Engineering and Nuclear Engineering Technology: PROFESSORS Wang (department head), Spinrad
ASSOCIATE PROFESSORS Barton, Ringle, Robinson.
ASSISTANT PROFESSORS Binney, Hornyik, Johnson, Selmer

* *Licensed Professional Engineers.*

THE SCHOOL OF ENGINEERING at Oregon State University grew out of a department established in 1889. Its purpose is to provide a quality education for students who are entering the engineering profession. It has awarded more than 12,000 degrees, and the reputation that its graduates have established in industry, business, and government through their imaginative work and leadership attests to the accomplishments of the School in providing a sound education.

Students choose their major from among the curricula of the Agricultural, Chemical, Civil, Electrical and Computer, Industrial and General, Mechanical and Metallurgical, and Nuclear Engineering Departments. These seven departments offer eleven major curricula in engineering and six curricula in engineering technology.

Engineering

Engineering is a profession which makes economic use of materials, money, and manpower to provide a broad range of services and facilities for human needs through proper planning, design, construction, and management. It is a licensed profession in all of the states, and educational patterns must meet high professional standards since the engineer is not only responsible for good planning and design but also for the safety of the public that uses his works. In order to prepare for the professional practice of engineering, the student must complete an accredited curriculm that includes a balance of courses in science, liberal arts, engineering science, and engineering analysis and design. Each curriculum requires 204 term hours and is designed as a four-year program of study.

Engineering Technology

Engineering technology is a field that is intimately associated with engineering but has a separate objective. The engineering technologist is prepared to work with the engineer and to implement engineering designs through the phases of construction, management, and operation. To prepare for a career in engineering technology the student must complete a curriculum that includes a balance of courses in science, liberal arts, business-oriented subjects, and subjects in engineering and technology. Each technology curriculum requires 192 term hours and is designed as a four-year program of study.

Opportunity in Engineering

Opportunities for employment in engineering and engineering technology continue to be excellent on a long-range basis. The demand for engineers and engineering technologists has grown steadily because of the growing needs of people and because of the constantly increasing technical nature of our industrial society. Companies and government agencies are looking for men and women with technical education who are capable of assuming responsibility in planning, design, consulting, operations, construction, production, research and development, maintenance, sales and services, and administration of engineering works. Salaries and rate of advancement in engineering compare favorably with those of the other recognized professions.

Accreditation

Professional standards are assured by periodic inspection of the School by off-campus teams operating under the Engineers' Council for Professional Development (ECPD), a national, unified accreditation organization. The major curricula at Oregon State University are accredited by ECPD, with Civil, Electrical, and Mechanical Engineering being first accredited in 1937; Chemical Engineering in 1942; Agricultural Engineering in 1949; Industrial Engineering in 1950; and Nuclear Engineering in 1973. Civil Engineering Technology and Mechanical Engineering Technology were accredited in 1971.

Admission

Students must meet the standard admission requirements of the University. To engage in the regular engineering program, students must also have demonstrated by score on the Scholastic Aptitude Test (SAT) a satisfactory knowledge of mathematics with which placement in physics is correlated. High school preparation for entrance into the regular engineering program at the freshman level should include physics, chemistry, and mathematics through algebra and trigonometry. Students who have not taken these high school courses can enroll in engineering but must usually take some remedial courses before entering the regular program.

Students transferring at an advanced level from non-ECPD accredited schools may be required to complete an examination in the field of their major to establish their ability to engage in courses at the level indicated by their prior academic training.

Because of the technical and professional requirements of the engineering curricula, the School reserves the right of final determination in matters of admission, retention, reinstatement, placement, and transfer of students.

Honors Program

Engineering students may elect to participate in the University Honors Program which provides enriched educational opportunities to students of superior scholastic ability. All of the facilities of the University are available to provide a wide variety of intellectual experiences. Flexibility is stressed in an effort to tailor the education to the needs of the individual. See UNIVERSITY HONORS PROGRAM elsewhere in this catalog.

Graduate Study

Due to the growing complexity of modern engineering practice, graduate study beyond the baccalaureate degree is becoming increasingly important for those students who wish to specialize. Students who have established satisfactory undergraduate records and are looking for the greatest opportunity in their professional field should consider continuation of their education at the graduate level. Study for the Master of Science (M.S.) normally requires one year beyond the B.S. degree. The Doctor of Philosophy (Ph.D.) degree requires three to four additional years.

Degrees Offered

Bachelor of Science, B.S.
Bachelor of Arts, B.A.
Agricultural Engineer, A.E.
Chemical Engineer, Ch.E.
Civil Engineer, C.E.
Electrical Engineer, E.E.
Industrial Engineer, I.E.
Mechanical Engineer, M.E.
Metallurgical Engineer, Met.E.
Mining Engineer, Min.E.
Master of Arts, M.A.
Master of Science, M.S.
Master of Engineering, M.Eng.
Master of Materials Science, M.Mat.Sc.
Master of Ocean Engineering, M.Oc.E.
Doctor of Philosophy, Ph.D.

Curricula in Engineering and Technology

Agricultural Engineering

E.C.P.D. Accredited

Freshman Year

	Hours
Engr Orientation (Engr 101,102,103)	6
Calculus Preparation (Mth 110)	4
Calculus (Mth 111,112)	8
General Physics (Ph 211)	4
English Composition (Wr 121)	3
General Chemistry (Ch 201,202,203)	9
Special Studies (AE 199)	2
Humanities and social science	9
Physical education (3 terms)	
Personal health (1 term)	

Sophomore Year

Calculus (Mth 113,211)	8
Applied Differential Equations (Mth 321)	4
General Physics (Ph 212,213)	8
Mechanics of Solids (Engr)	8
Introductory Microbiology (Mb 130)	3
Agricultural Mechanics (AET 221)	3
Computer Applications (AE 356)	3
Engine Theory and Operation (AET 312)	3
Technical Report Writing (Wr 327)	3
Humanities and social science	9

Junior Year

Thermodynamics (Engr 311,312)	6
Momentum, Energy, and Mass Transfer (Engr 331,332)	8
Electrical Fundamentals (Engr 221)	4
Engineering Analysis (ME 371)	3
Power Farming Machinery (AE 491)	3
Agricultural Machine Design (AE 492)	3
General Biology (GS 101,102)	8
Crop Production (ACS 211)	5
Soils (Sls 210)	5
Seminar (AE 407)	1
* Electives	6

Senior Year

Humanities and social science	9
Soil and Water Conservation (AE 471)	3
Drainage Engineering (AE 472)	3
Irrigation System Design (AE 473)	3
Rural Electrification (AE 431)	3
Farm Structures (AE 461)	3
Engineering economy	3
Seminar (AE 407)	1
Communication elective	3
Engineering science elective	4
* Electives	15

* 9 hours of electives are to be in engineering science, synthesis, or design and approved by student's adviser. The remaining elective hours are unrestricted.

Chemical Engineering

E.C.P.D. Accredited

Freshman Year

	Hours
Chemical Engr Orientation (ChE 101,102)	6
Calculus Preparation (Mth 110)	4
Calculus (Mth 111,112)	8
General Chemistry (Ch 204,205,206)	15
General Physics (Ph 211)	4
English Composition (Wr 121)	3
Humanities and social science	6
Personal health (H 160)	
Physical education (2 terms)	

Sophomore Year

Engineering Stoichiometry (ChE 211,212)	4
Computer-Aided Stoichiometry (ChE 213)	2
Calculus (Mth 113,211)	8
Applied Differential Equations (Mth 321)	4
Organic Chemistry (Ch 334,335,336)	9
General Physics (Ph 212)	4
Mechanics of Solids (Engr)	8
Humanities and social science	8
[1] Communications	3
Physical education (1 term)	

Junior Year

Chem Engineering Problems (ChE 323)	3
Measurement and Instrument (ChE 313)	2
Thermodynamics (Engr 311,312,313)	9
Momentum, Energy, Mass Transfer (Engr 331,332,333)	11
Electrical Fundamentals (Engr 221,222)	8
Physical Chemistry (Ch 423,424,425)	9
[1] Communications	3
Humanities and social science	6

Senior Year

Unit Operations (ChE 411,412)	6
Chemical Engineering Lab (ChE 414,415)	6
Chemical Reaction Engineering (ChE 443)	3
Chemical Plant Design (ChE 431)	3
Process Dynamics and Control (ChE 461)	3
[2] Chem Engr Calculations (ChE 425,426)	6
Analytical Chemistry (Ch 421)	4
Humanities and social science	6
Science elective	3
Unrestricted electives	12
Field trip	0

[1] Communication courses to be selected from Speech Communication, Technical Report Writing, English Composition.

[2] May be omitted if Chemical Plant Design (ChE 432) and three hours of restricted electives are completed with the advisement of the departmental faculty.

Civil Engineering

E.C.P.D. Accredited

Freshman Year

	Hours
Civil engr orientation	6
Calculus Preparation (Mth 110)	4
Calculus (Mth 111,112)	8
General physics	8
[1] Humanities and social science electives	15
English Composition (Wr 121)	3
[2] Communication skills elective	3
Physical education (3 terms)	

Sophomore Year

Mechanics of Solids (Engr)	8
Strength of materials	4
Electrical Fundamentals (Engr 221)	4
Calculus (Mth 113,211)	8
Applied Differential Equations (Mth 321)	4
General Chemistry (Ch 201,202)	6
[2] Engineering science electives	8
[2] Science electives	9
Personal health (1 term)	

Junior Year

Structural Theory (CE 381,382,383)	9
Fluid Mechanics (Engr 301,302)	6
Hydraulics (CE 312)	3
Soil Mechanics (CE 371,372)	6
Sanitary Engineering (CE 451)	3
Transportation Engineering (CE 421,422)	6
Surveying Theory (CE 361)	3
[2] Engineering science electives	7
[2] Technical electives	3
Seminar (CE 407)	1
[2] Communication skills elective	3
[3] Unrestricted elective	3

Senior Year

Reinforced Concrete (CE 481)	3
Sanitary Engineering (CE 452)	3
[2] Technical electives	27
[1] Humanities and social science electives	9
[3] Unrestricted electives	6
Field experience	0

[1] Twenty-four credit hours of approved electives in humanities and social science are required in addition to English Composition. Check with department regarding approved courses and requirements.

[2] Approved electives in science, engineering science, and technical areas may be selected by the student upon advisement with departmental faculty.

[3] Nine credit hours of unrestricted electives may be selected from any University offering including officer training or any accepted transfer credit.

Electrical and Computer Engineering

E.C.P.D. Accredited

Freshman Year

	Hours
Engr Orientation (EE 101)	3
Computations in Engr (EE 102)	3
Logic Systems (EE 103)	3
Calculus Preparation (Mth 110)	4
Calculus (Mth 111,112)	8
[1] Science elective	13
[2] Humanities or social science elective	8
English Composition (Wr 121)	3
Elective	3
Physical education (3 terms)	

Sophomore Year

Elec Fundamentals (Engr 221,222)	8
Materials (Engr 323)	4
[3] Engineering sci elective	8
Calculus (Mth 113,211)	8
Differential Equations (Mth 321)	4
[1] Science elective	8
[2] Humanities or social science elective	9
Personal health (1 term)	

Junior Year

EE 321 Circuits	4
EE 322 Electronic Circuits	4
EE 323 Digital Circuits I	4
Transmission Systems (EE 311)	4
[4] Junior departmental elective	8
[3] Engineering science elective	11
[2] Humanities or social science elective	4
[5] Restricted elective	8
Elective	3
Seminar (EE 407)	1

Senior Year

Probabilistic Meth in Elec Engr (EE 415)	4
[6] Senior departmental electives	20
Projects (EE 406)	6
[2] Humanities or social science	6
[5] Restricted elective	12
Elective	3

[1] Science electives must include a minimum of 12 hours in physics and/or chemistry together. A total of 21 hours in science electives is required.

[2] Humanities or social science electives must be chosen from an approved list on file in the dean's office. A total of 27 hours with the equivalent of a year sequence in at least two subject areas is required.

[3] A minimum of 19 hours (16 for Computer Science) in addition to Engr 221, 222, and 323 is required for engineering science electives (excluding Engineering Economy).

[4] Chosen from EE 312, 331, 371 or 372 with advisement.

[5] Chosen from appropriate linear and discrete mathematics, statistics, science, or engineering elective with advisement.

[6] A concentration of coursework in a systems area is normally required.

Engineering (Computer Science)

Offered through the Department of Electrical and Computer Engineering

Freshman Year

	Hours
Engr Orientation (EE 101)	3
Computations in Engr (EE 102)	3
Logic Systems (EE 103)	3
Calculus Preparation (Mth 110)	4
Calculus (Mth 111,112)	8
[1] Science elective	13
[2] Humanities of social sciences	8
English Composition (Wr 121)	3
Elective	3
Physical education (3 terms)	

Sophomore Year

Elec Fundamentals (Engr 221,222)	8
Materials (Engr 323)	4
[3] Engineering science elective	8
Calculus (Mth 113,211)	8
Differential Equations (Mth 321)	4
[1] Science elective	8
[2] Humanities or social science elective	9
Personal health (1 term)	

Junior Year

EE 321 Circuits	4
EE 322 Electronic Circuits	4
EE 323 Digital Circuits I	4
Switching and Coding (EE 371,372)	8
Electromagnetic Fields (EE 312)	4
[3] Engineering science elective	8
[5] Restricted electives	8
[2] Humanities and social science elective	4
Elective	6
Seminar (EE 407)	1

Senior Year

Computer Engineering (EE 473,474)	8
[6] Departmental electives	16
Projects (EE 406)	6
[2] Humanities and social science elective	6
Numerical Methods (Mth 487,488,489)	9
[5] Restricted electives	6

[1-6] See Electrical and Computer Engineering footnotes.

Engineering Physics

Students electing the curriculum in engineering physics register under the School of Engineering in the Department of Physics by cooperative arrangement.

Freshman Year

	Hours
Calculus (Mth 111,112,113)	12
General Physics (Ph 211,212)	8
General Chemistry (Ch 204,205,206)	15
English Composition (Wr 121)	3
Personal Health (H 160)	2
Free and/or restricted electives	8
Physical education (3 terms)	

Sophomore Year

Calculus (Mth 211)	4
Applied Diff Equations (Mth 321,322)	8
General Physics (Ph 213,214)	8
Mechanics of Solids (Engr)	4
Electrical Fundamentals (Engr 221,222)	8
Materials Science (Engr 321)	4
Free and/or restricted electives	15

Junior Year

	Hours
Mechanics (Ph 424,425)	6
Electromagnetism (Ph 431,432)	6
Mth Meth for Engr & Phys (Mth 481,482)	6
Physical Chemistry (Ch 440,441)	6
[1] Free and/or restricted electives	27

Senior Year

Modern Physics (Ph 474,475,476)	9
[1] Free and/or restricted electives	42

[1] The 92 hours of free and restricted electives are composed of: 12 hours of engineering science; 18 hours of engineering design, analysis, or synthesis; 24 hours of humanities and social sciences; 4 hours of computer science (CS 213); 34 hours of free electives.

General Engineering

Freshman Year

	Hours
Engr Orientation (GE 101,102,103)	6
Calculus Preparation (Mth 110)	4
Calculus (Mth 111,112)	8
English Composition (Wr 121)	3
Graphics (GE 115,116)	6
Chemistry (Ch 201,202)	6
Humanities and social science elective	9
Seminar or other elective	3
Science elective	3
Physical education (3 terms)	

Sophomore Year

Calculus (Mth 113,211)	8
Applied Differential Equations (Mth 321)	4
General physics	8
Mechanics of Solids (Engr)	8
Mathematical Models (IE 271,272,273)	9
[1] Communications courses	9
Seminar or other elective	1
Science elective	4

Junior Year

Electrical Fundamentals (Engr 221)	4
[2] Engineering science (Engr) elective	12
Humanities and social science elective	9
[3] Restricted electives (option)	18
Seminar (GE 407)	3
Elective	3
Personal health (1 term)	

Senior Year

[2] Engineering science (Engr) elective	9
Analysis and Design (GE 411,412,413)	9
Humanities and social science elective	9
[3] Restricted electives (option)	18
Engineering economy	3
Elective	3

[1] Approved communications courses upon advisement of departmental faculty.

[2] Electrical Fundamentals, Thermodynamics, Mechanics of Fluids, Materials, or Momentum, Energy, and Mass Transfer.

[3] Appropriate courses for engineering or non-engineering option upon departmental advisement.

Industrial Engineering

E.C.P.D. Accredited

Freshman Year

	Hours
Engr Orientation (GE 101,102,103)	6
Calculus Preparation (Mth 110)	4
Calculus (Mth 111,112)	8
General physics	4
Economics (Ec 213,214)	8
English Composition (Wr 121)	3
Manufacturing Processes (ME 262)	3
General Chemistry (Ch 201,202)	6
Elective	3
[1] Approved hum and soc sci elective	3
Physical education (3 terms)	

Sophomore Year

Calculus (Mth 113,211)	8
Applied Differential Equations (Mth 321)	4
Science elective	7
General physics	4
Mathematical Models (IE 271,272,273)	9
Mechanics of Solids (Engr)	8
Electrical Fundamentals (Engr 221)	4
Basic Accounting and Fin Anal (BA 217)	3
[1] Approved hum and soc sci elective	3
Personal health (1 term)	

Junior Year

Systems Analysis I (IE 371)	5
Systems Analysis II (IE 372)	4
Engineering economy	3
Electr Data Proc Sys (IE 311,312)	8
Design Graphics (GE 415)	3
Engineering science electives	8
Materials Science (Engr 321)	4
General Psychology (Psy 200)	5
[1] Restricted electives	8
[1] Approved hum and soc sci elective	3

Senior Year

Management Models (IE 471)	3
Ind Engr Anal and Design (IE 497,498)	6
Quality and Reliability Control (IE 491)	4
Environmental Design (IE 441)	4
Ind Supervision Prin (IE 451)	3
Industrial Engineering Seminar (IE 407)	2
Technical Report Writing (Wr 327)	3
Engineering science electives	8
[1] Restricted electives	7
Electives	5
[1] Approved hum and soc sci electives	5

[1] Humanities, social sciences, and restricted electives are approved upon advisement with departmental faculty.

Mechanical Engineering

E.C.P.D. Accredited

Freshman Year

	Hours
Mech Engr Orientation (ME 101,102)	6
Calculus Preparation (Mth 110)	4
Calculus (Mth 111,112)	8
General Physics I (Ph 211)	4
General Chemistry (Ch 201,202,203)	9
English Composition (Wr 121)	3
[1] Elective	4
[2] Humanities sequence	9
Physical education (3 terms)	

Sophomore Year

Calculus (Mth 113)	4
Calculus of Several Variables (Mth 211)	4
Applied Differential Equations (Mth 321)	4
General Physics I (Ph 212,213,214)	12
[3] Mechanics of Solids (Engr)	8
Electrical Circuit Fund (Engr 221)	4
Electrical Control Fund (Engr 222) or Electrical Energy Con Fund (Engr 223)	4
Engineering Mechanics (ME 312)	3
Manufacturing Processes (ME 262)	3
Principles of Economics (Ec 213)	4
Personal health (1 term)	

Junior Year

Engineering Mechanics (ME 311)	3
Mechanical Laboratory (ME 351)	3
Engineering Analysis (ME 371)	3
Mathematical Models (IE 272)	3
Thermodynamics (Engr 311,312,313)	9
Materials Science (Engr 321)	4
Mech Properties of Materials (Engr 322)	4
Momentum, Energy and Mass Trans (Engr 331,332)	8
Principles of Economics (Ec 214)	4
Humanities or social science electives	9

Senior Year

Mech Anal and Design (ME 411,412,413)	9
Mechanical Laboratory (ME 437)	3
Mechanical Engr Economy (ME 460)	3
Seminar (ME 407)	1
[4] Restricted electives	18
Electives	18

[1] A minimum acceptable level of competence in graphic communication, demonstrated by passing a graphics communication exam or by completing GE 115 with a grade not lower than C, is prerequisite for all ME courses above 350.

[2] Subjects to be selected upon advisement and from an approved departmental listing.

[3] A grade of C or better is required in each course of an Engr sequence listed before proceeding to the subsequent course of the sequence.

[4] Not less than 9 term hours to be in one of the following areas: aeronautical, applied mechanics, automotive, or general mechanical engineering.

AEROSPACE ENGINEERING

(An option in mechanical engineering)

Freshman Year

	Hours
Mech Engr Orientation (ME 101,102)	6
Calculus Preparation (Mth 110)	4
Calculus (Mth 111,112)	8
General Physics I (Ph 211)	4
General Chemistry (Ch 201,202,203)	9
English Composition (Wr 121)	3
[1] Elective	4
[2] Humanities sequence	9
Physical education (3 terms)	

Sophomore Year

Calculus (Mth 113)	4
Calculus of Several Variables (Mth 211)	4
Applied Differential Equations (Mth 321)	4
General Physics I (Ph 212,213,214)	12
[3] Mechanics of Solids (Engr)	8
Electrical Circuit Fund (Engr 221)	4
Electrical Control Fund (Engr 222) or Electrical Energy Con Fund (Engr 223)	4
Engineering Mechanics (ME 312)	3
Introduction to Aero Engr (ME 291)	3
Principles of Economics (Ec 213)	4
Personal health (1 term)	

Junior Year

Applied Differential Equations (Mth 322)	4
Engineering Mechanics (ME 311)	3
Mechanical Laboratory (ME 351)	3
Engineering Analysis (ME 371)	3
Mathematical Models (IE 272)	3
Thermodynamics (Engr 311,312,313)	9
Materials Science (Engr 321)	4
Mech Prop of Materials (Engr 322)	4
Momentum, Energy, and Mass Trans (Engr 331,332)	8
Principles of Economics (Ec 214)	4
Humanities or social sci electives	6

Senior Year

Seminar (ME 407)	1
Aerospace Engr Design (ME 451,452)	6
Mechanical Laboratory (ME 437)	3
Mechanical Engr Economy (ME 460)	3
Rocket and Space Propulsion (ME 441)	3
Aerodynamics (ME 454,455,456)	9
Aircraft Performance (ME 457)	3
Aircraft Stability and Control (ME 458)	3
Humanities or social science elective	3
Electives	17

[1] A minimum acceptable level of competence in graphic communication, demonstrated by passing a graphics communication exam or by completing GE 115 with a grade not lower than C, is prerequisite for all ME courses above 350.

[2] Subjects to be selected upon advisement and from an approved departmental listing.

[3] A grade of C or better is required in each course of an Engr sequence listed before proceeding to the subsequent course of the sequence.

Metallurgical Engineering

Freshman Year

	Hours
Mech Engr Orientation (ME 101,102)	6
Calculus Preparation (Mth 110)	4
Calculus (Mth 111,112)	8
General Chemistry (Ch 201,202,203)	9
General Physics I (Ph 211)	4
English Composition (Wr 121)	3
Humanities and social science electives	9
Unrestricted elective	7
Physical education (3 terms)	

Sophomore Year

Mechanics of Solids (Engr)	8
Electrical Circt Fundamentals (Engr 221)	4
Calculus (Mth 113)	4
Calculus of Several Variables (Mth 211)	4
Applied Differential Equations (Mth 321)	4
General Physics I (Ph 212,213)	8
Technical Report Writing (Wr 327)	3
Intro to Metallurgical Engr (MetE 201)	3
Humanities and social science electives	8
Science elective	3
Personal health (1 term)	

Junior Year

Thermodynamics (Engr 311,312,313)	9
Materials Science (Engr 321)	4
Mechanical Prop of Materials (Engr 322)	4
Momentum, Energy, and Mass Transfer (Engr 331,332)	8
Engineering science elective	3
Metallurgical Equip and Meas (MetE 425)	3
Physical Chemistry (Ch 340)	3
Humanities and social science electives	9
Unrestricted electives	6

Senior Year

Met and Ceram Appl Engr (MetE 411, 412,413)	9
Trans, Struc, and Prop of Alloys (MetE 421,422)	8
Unit Operations in Metal Engr (MetE 431)	3
Unit Proc in Metal Engr (MetE 432)	3
Process Metallurgy (MetE 433)	3
Projects (MetE 406)	3
Seminar (MetE 407)	1
Mechanical Engr Economy (ME 460)	3
Restricted electives	9
Unrestricted electives	9

Nuclear Engineering

E.C.P.D. Accredited

Freshman Year

	Hours
Nuc Engineering Orien (NE 101,102)	6
Introductory Nuc Engineering (NE 103)	3
Calculus Preparation (Mth 110)	4
Calculus (Mth 111,112)	8
General Chemistry (Ch 201,202,203)	9
General Physics I (Ph 211)	4
Personal Health (H 160)	2
English Composition (Wr 121)	3
[1] Electives	9
Physical education (3 terms)	

Sophomore Year

Calculus (Mth 113)	4
Calculus of Several Variables (Mth 211)	4
Applied Differential Equations (Mth 321)	4
General Physics I (Ph 212,213,214)	12
Mechanics of Solids (Statics)	4
Electrical Circuit Fundamentals (Engr 221)	4
Nuclear Energy Fundamentals (NE 201)	3
Nuclear Radiation and Matter (NE 202)	3
Nuclear Radiation Detection and Measurement (NE 203)	3
[1] Electives	13

Junior Year

Thermodynamics (Engr 311,312)	6
Momentum, Energy, and Mass Transfer (Engr 331,332)	8
Applied Differential Equations (Mth 322)	4
Fortran Programming (CS 213)	4
Nuclear Fuel Cycle (NE 341)	3
Radiochemistry (Ch 316)	3
Nuclear Materials (NE 481)	3
Materials Science (Engr 321)	4
[1] Electives	16

Senior Year

Reactor Analy and Computa (NE 421, 422,423)	12
Reactor Thermohydraulics and Power Generation (NE 461,462)	6
Reactor Design (NE 463)	3
Reactor Safety Engineering (NE 464)	3
Nuc Engineering Expermnts (NE 441,442)	6
[1] Electives	18

[1] The 56 hours of electives are composed of: 27 hours of humanities and social science electives from approved departmental list, 9 hours of free electives, 13 hours of restricted electives approved by adviser, and 8 hours (minimum) of approved engineering science electives.

Agricultural Engineering Technology

See School of Agriculture

Civil Engineering Technology

Option, construction engineering technology

E.C.P.D. Accredited

Elective courses in surveying and mapping are available for students wishing to prepare for a career in this field.

Freshman Year

(Common to all CET Curricula)

	Hours
Technical Problems (CET 111,112,113)	6
Graphics (GE 115)	3
General Physics (Ph 201,202,203)	12
English Composition (Wr 121)	3
Fundamentals of Speech (Sp 111)	3
Calculus Preparation (Mth 110)	4
Calculus (Mth 111,112)	8
Electives in social science	9
Physical education (3 terms)	

Sophomore Year

(Common to all CET Curricula)

Plane Surveying (CET 221,222,223)	9
Mechanics (Statics, Dynamics, Strength of Materials) (CET 252,253,254)	9
Civil Engineering Drawing (CET 232)	3
Fund of Estimating (CET 261)	3
Quantitative Business Methods (BA 235)	4
Introduction to Mgmt Sci (BA 238)	4
Financial Accounting (BA 211)	4
Managerial Accounting (BA 212)	4
General Chemistry (Ch 201)	3
Unrestricted elective	3
Personal health (1 term)	

Junior Year

Production (BA 311)	4
Marketing (BA 312)	4
Finance (BA 313)	4
Technical Report Writing (Wr 327)	3
Project Scheduling (CET 381)	3
Hydraulics (CET 321)	3
Estimating and Cost Control (CET 362)	3
Constr Engr Economy (CET 371)	3
Cost Accounting (BA 421)	3
[1] Approved electives	5
[1] Restricted electives	12

Senior Year

Structural Problems (CET 451,452)	8
Contracts and Specifications (CET 461)	3
Labor Problems (Ec 425)	3
Human Relations in Business (BA 361)	3
Principles of Economics (Ec 213,214)	8
[1] Approved electives	9
[1] Restricted electives	9
Seminar (CET 407)	3
Field trip	0

[1] Consult Department regarding approved and restricted electives.

TECHNOLOGY OPTIONS

(Courses Required in the Basic Curriculum as Approved or Restricted Electives)

Junior Year

Hydraulics (CET 322)	3
Const Mat Lab (CET 341,342,343)	9

Senior Year

Business Law (BA 412)	3
Const Meth and Cont (CET 441,442,443)	9

Manufacturing Engineering Technology

Mech Tech Orientation (MT 101)	3
Graphics (GE 115,116)	6
General Chemistry (Ch 104,105)	9
General Physics (Ph 201,202)	8
English Composition (Wr 121)	3
Calculus Preparation (Mth 110)	4
Calculus (Mth 111)	4
Humanities or social science elective	8
Personal health (1 term)	
Physical education (2 terms)	

Sophomore Year

Intro to Mechanics (MT 211,212,213)	9
Mechanical Tech Analysis (MT 220)	3
FORTRAN Programming (CS 213)	4
Mechanisms (MT 201)	3
Circ, Instr, and Systems (Sys 201,202,203)	9
Cast Metal Processes (MT 240)	3
Welding and Fabrication (MT 250)	3
Machine Tool Practices (MT 260)	3
Basic Accnt and Finan Anal (BA 217)	3
[1] Humanities or social science elective	7
Physical education (1 term)	

Junior Year

Metallurgy and Mater (MT 301,302,303)	9
Applied Heat Power (MT 321,322)	8
Mathematical Models (IE 272)	3
[2] Business elective	8
Numerical Control Tech (MT 366)	3
Production Welding (MT 454)	4
Metrology and Quality Control (MT 368)	5
Preliminary Design Problems (MT 381)	1
Technical Writing (Wr 327)	3
[1] Humanities or social science elective	3
Free elective	3

Senior Year

Casting and Patternmaking Process (MT 444,445)	8
Mass Production Methods (MT 464,465)	10
Automated Manufacturing Tech (MT 466)	3
Engineering Economy	3
[1] Humanities or social science elective	8
Free elective	13

[1] Selected upon advisement following the current department guidelines including 14 hours or more of social sciences.

[2] BA 302, 315, or 361.

Mechanical Engineering Technology

E.C.P.D. Accredited

Freshman Year

	Hours
Mech Tech Orientation (MT 101)	3
Graphics (GE 115,116)	6
General Chemistry (Ch 104,105,106)	13
General Physics (Ph 201,202)	8
English Composition (Wr 121)	3
Calculus Preparation (Mth 110)	4
Calculus (Mth 111)	4
[1] Humanities or social science elective	4
Personal health (1 term)	
Physical education (2 terms)	

Sophomore Year

Intro to Mechanics (MT 211,212,213)	9
Mechanical Tech Analysis (MT 220)	3
Mechanisms (MT 201)	3
FORTRAN Programming (CS 213)	4
Cast Metal Processes (MT 240)	3
Welding and Fabrication (MT 250)	3
Machine Tool Practices (MT 260)	3
Circuits, Instr, and Sys (Sys 201,202,203)	9
Basic Accounting and Financial Analysis (BA 217)	3
[1] Humanities or social science elective	8
Physical education (1 term)	

Junior Year

Metallurgy and Materials (MT 301,302, 303)	9
Applied Heat Power (MT 321,322,323)	12
Mathematical Models (IE 272)	3
[2] Business electives	8
Technical Writing (Wr 327)	3
Engineering economy	3
Preliminary Design Problems (MT 381)	1
[1] Humanities or social science elective	4
Free elective	3

Senior Year

Mechanical Design (MT 411)	3
Mech and Electr Equipment of Bldgs (MT 425)	3
Automatic Control Systems (MT 426)	3
[3] Technical electives	18
Free electives	11
[1] Humanities or social science elective	10

[1] Selected upon advisement following the current department guidelines including 14 hours or more of social science.

[2] BA 302,315, or 361.

[3] Technical electives to be selected from 400-level MT courses upon advisement with departmental faculty.

Nuclear Engineering Technology

Freshman Year

	Hours
Engineering Orientation (NT 101,102)	6
Intro Nuclear Engineering (NT 103)	3
[1] Mathematics (Mth 102,110,111)	12
General Chemistry (Ch 201,202,203)	9
[2] Electives	11
Personal Health (H 160)	2
English Composition (Wr 121)	3
Physical education (3 terms)	

Sophomore Year

General Physics (Ph 201,202,203)	12
[2] Electives	18
Nuclear Energy Fundamentals (NT 201)	3
Nuclear Radiation and Matter (NT 202)	3
Nuc Radiation Detec and Meas (NT 203)	3
Mechanical Analysis (MT 220)	3
Circuits, Instr, and Systems (Sys 201,202)	6

Junior Year

Elem Reactor Engrng (NT 301,302,303)	9
App Heat and Power (MT 321,322,323)	12
Radiation Protection (NT 311,312)	8
Radiochemistry (Ch 316)	3
Metallurgy and Mater (MT 301,302,303)	9
[2] Electives	9

Senior Year

Nuc Rules and Regulations (NT 411)	3
Nuclear Safety Analysis (NT 412)	3
Nuclear Plant Environ Impact (NT 413)	3
Nuclear Power Plant Tech (NT 431,432)	8
Nuc Tech Experiments (NT 491,492)	6
[2] Electives (Field Practice) (NT 410)	21
Seminar (NT 407)	1

[1] Adjustments may be required to accommodate different levels of high school preparation.
[2] Electives include: 27 hours of humanities and social science electives from approved departmental list, 26 hours of electives approved by adviser, 6 hours of free electives.

Systems Technology

Freshman Year

	Hours
Systems Tech (Sys 101,102,103)	6
English Composition (Wr 121)	3
Calculus Preparation (Mth 110)	4
Calculus (Mth 111,112)	8
Humanities or social science electives	9
General Chemistry (Ch 104,105)	9
Elective	4
Physical education (3 terms)	

Sophomore Year

Cir, Instr, and Sys (Sys 201,202,203)	9
General Physics (Ph 211,212)	8
Mathematical Models (IE 271,272,273)	9
Principles of Accounting (BA 211,212)	8
Communication elective	3
Elective	8
Personal health (1 term)	

Junior Year

Systems Projects (Sys 406)	3
Marketing (BA 312)	4
Finance (BA 313)	4
Principles of Economics (Ec 213,214)	8
Electronic Data Processing (IE 311,312)	8
Communication elective	3
Elective	3
[1] Restricted electives	18

Senior Year

Systems Projects (Sys 406)	3
Information Sys Design (Sys 411,412,413)	9
Business Law (BA 315)	4
Human Relations in Business (BA 361)	4
Humanities or social science elective	10
Elective	4
[1] Restricted electives	14

Electric Systems Technology Option

Junior Year

	Hours
Electrical Equipment (Sys 301,302,303)	9
Electrical Instruments (Sys 311,312,313)	9

Senior Year

Electr Power Gen, Trans, & Distr (Sys 421, 422,423)	9
[2] Electric Systems electives	5

Information Systems Technology Option

Junior Year

[2] Information Systems electives	18

Senior Year

[2] Information Systems electives	14

[1] Courses in option.
[2] Consult department for acceptable electives.

Courses in Engineering and Technology

ENGINEERING

Each engineering curriculum includes a number of courses that are appropriate for all engineering students. Because of their commonality, these are called common core courses. Approximately 32 hours of such courses are devoted to engineering science instruction.

Engineering sciences have their roots in mathematics and basic science and serve as a bridge between science and engineering. They involve the application of scientific method to practical engineering-type situations and lead to solution of problems that are fundamental in analysis, design, and synthesis. The following courses are managed by the Office of the Dean of the School of Engineering.

Common Engineering Course

Engr 101,102,103
Engineering Orientation
2 hours each term 1 ① 1 ②
Departmental engineering orientation.

Engineering Science Courses

Lower Division Courses

Engr 211,212,213 Mechanics of Solids
3 hours each term 2 ① 1 ②
Principles of mechanics: particles, systems of discrete particles, rigid bodies, and deformable bodies. Prerequisite: Mth 112.

Engr 221
Electrical Circuit Fundamentals
4 hours 3 ① 1 ②
Electrical circuit theory. Steady-state circuits and systems. Prerequisite: Mth 112.

Engr 222
Electrical Control Fundamentals
4 hours 3 ① 1 ②
Transformers, electronic amplifiers, and linear control systems. Transient and steady-state analysis of circuits and systems. Prerequisite: Engr 221.

Engr 223 Electrical Energy Conversion Fundamentals
4 hours 3 ① 1 ②
Electronic amplifiers, transformers, and energy conversion devices. Prerequisite: Engr 221.

Upper Division Courses

Engr 301,302 Mechanics of Fluids
3 hours each term 2 ① 1 ②
Incompressible and compressible fluids; effects of fluid properties upon pressure distribution and flow patterns; similitude relationships. Prerequisite: Mth 321; Mechanics (statics and strength).

Engr 311,312,313 Thermodynamics
3 hours each term 2 ① 1 ②
Laws of thermodynamics, closed and open (control volume) systems; thermodynamics properties; thermodynamic cycles, phase and chemical equilibria, and gas dynamics. Prerequisite: Mth 211; Ch 203.

Engr 321 Materials Science
4 hours 3 ① 1 ②
Structure and properties of metals, ceramics, and organic materials; control of structure during processing and structural modification by service environment. Prerequisite: Mth 112; Ch 203.

Engr 322
Mechanical Properties of Materials
4 hours 3 ① 1 ②
Mechanical behavior of materials, relating laboratory test results to material structure and elements of mechanical analysis. Prerequisite: Mechanics (statics and strength); Engr 321.

Engr 323
Physical Properties of Materials
4 hours 4 ①
Properties determined by free electron behavior: electrical, thermal, dielectric, optical, and magnetic properties. Prerequisite: Engr 221,321.

Engr 331,332,333
Momentum, Energy, and Mass Transfer
4, 4, 3 hours 3 ① 1 ②, 3 ① 1 ②, 2 ① 1 ②
A unified treatment using control volume and differential analysis of: fluid flow, momentum transfer, conductive, convective and radiative energy transfer, binary mass transfer and prediction of transport properties. Corequisite: Engr 311. Prerequisite: Mth 321; Mechanics (dynamics).

AGRICULTURAL ENGINEERING

Agricultural engineering provides for imaginative and creative applications of engineering principles and problem-solving techniques to the production, processing, and handling of man's food supply and the management of his natural resources. Its goal is to improve the standard of living and quality of life through the development of agriculture.

The curriculum is flexible and diversified and is planned to help students prepare for employment in positions of responsibility in agriculture and agriculture-related industries and in government. In addition to providing a strong foundation in the physical and engineering sciences, it allows a student to expand his interests into the liberal arts, biological sciences, and basic agriculture. The major areas of emphasis are in power and machinery, soil and water conservation, electric power and processing, structures and environment, and food engineering.

Lower Division Course

AE 199 Special Studies
Terms and hours to be arranged

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

***AE 313 Motor Vehicles**
3 hours 1 ① 2 ②
Maintenance management of motorized equipment. Unit repair of carburetion, injection, electrical, lubrication, and hydraulic systems. Performance under existing Federal and State regulations emphasized. Prerequisite: AET 312.

***AE 314 Motor Vehicles**
3 hours spring 2 ① 1 ③
Precision diagnostic, test, and repair equipment and tools for automotive vehicle maintenance. Engine and other major unit rebuilding procedures; electrical systems. Prerequisite: AE 313.

AE 356 Computer Applications
3 hours winter 3 ①
Application of digital computers to practical problems.

AE 401 Research
Terms and hours to be arranged

AE 405 Reading and Conference
Terms and hours to be arranged

AE 406 Projects
Terms and hours to be arranged

AE 407 Seminar
Terms and hours to be arranged

***AE 431 Rural Electrification (g)**
3 hours winter 3 ①
Electrical codes, electric motors, and motor controls. Application of electricity to agricultural loads. Prerequisite: Engr 221 or equivalent.

***AE 461 Farm Structures (g)**
3 hours spring 1 ① 2 ③
Materials and types of construction; services, uses, and economics of farm structures; structural, environmental, and system designing. Prerequisite: Mechanics (dynamics); Engr 312.

***AE 465 Building Cost Estimating (g)**
3 hours spring 2 ① 1 ②
Complete and approximate estimates; establishing unit prices, quantity surveying, overhead costs and profit estimates, specifications interpretations, estimates for separate contracts and subcontracts. Prerequisite: AA 179 or AET 361 or AE 461.

AE 466 Structural Reliability (G)
3 hours winter 3 ①
Probability review, load and strength probability distribution, reliability of simple and complex structures, reliability designing, student project. Prerequisite: Mechanics (dynamics); Mth 211.

***AE 471 Soil and Water Conservation (g)** 3 hours fall 3 ①
Mechanics of erosion. Design of erosion control structures. Estimation of water supplies and crop water requirements. Prerequisite: Engr 331.

***AE 472 Drainage Engineering (g)**
3 hours winter 3 ①
Benefits of drainage, hydraulics of soil profiles, drainage investigations, design of agricultural drainage systems, interceptor drains, construction practices, drainage enterprises. Prerequisite: Engr 331.

* Field trips may be required.

***AE 473 Irrigation System Design (g)**
3 hours spring 2 ① 1 ③
Sprinkler and gravity irrigation methods, design of farm irrigation systems, land leveling, performance characteristics of pumps and sprinkler irrigation equipment. Prerequisite: Engr 331.

***AE 491 Power Farming Machinery (g)** 3 hours fall 2 ① 1 ③
Power farming machinery; operation, calibration, selection, and systems of use. Prerequisite: Mechanics (dynamics).

***AE 492,493 Agricultural Machine Design (g)**
3 hours winter and spring 1 ① 2 ②
Mechanics, mechanisms, and strength of materials applied to the design of agricultural machines with consideration given to motion, size, material, strength, durability, and manufacturing processes. Prerequisite: AE 491.

Graduate Courses

See also courses marked (*g*) and (*G*) above

AE 501 Research
Terms and hours to be arranged

AE 503 Thesis
Terms and hours to be arranged

AE 505 Reading and Conference
Terms and hours to be arranged

AE 506 Projects
Terms and hours to be arranged

AE 507 Seminar
Terms and hours to be arranged

AE 508 Workshop
Terms and hours to be arranged

AE 511 Irrigation Science
3 hours spring 3 ①
Hydraulics of surface irrigation, irrigation structures, estimation of evapotranspiration, and new developments in irrigation science and technology. Offered alternate years. Not offered 1974-75.

AE 515 Agricultural Machine Applications and Methods
3 hours winter 2 ① 1 ③
Application of machines to changing agricultural methods, mechanization and labor economy, labor-saving equipment and applications, hydraulic control systems, specialty crop machines. Offered alternate years. Offered 1974-75.

***AE 520 Animal Waste Management**
3 hours 2 ① 1 ③
Planning and design of animal waste management systems. Prerequisite: Ch 203 and Mb 130 or equivalent.

AE 525 Processing Equipment for Agricultural Products
3 hours fall 2 ① 1 ③
Fundamental theory and applications of various methods and equipment used in the processing of agricultural products. Not offered 1974-75.

AE 530 Agricultural Instrumentation and Application
3 hours spring 2 ① 1 ③
Pyrometry, air measurements, psychrometry, soil and field-crop moisture determinations, and water measurements. Offered alternate years. Offered 1974-75.

* Field trips may be required.

AE 540 Mechanics of Fluids in Porous Media
3 hours fall 3 ①
Fundamentals of the mechanics of two immiscible fluids in porous media and their application to drainage, irrigation, engineering, and other soil-water problems. Soil physics, and fluid mechanics background desirable. Offered alternate years. Not offered 1974-75.

CHEMICAL ENGINEERING

Chemical engineers design and develop processes and plants for converting basic raw materials to products that are useful to mankind.

The chemical engineering curriculum provides students with a background of fundamental knowledge which prepares them for responsible positions in research and development, design, technical service, plant operation, technical sales, and management in a wide variety of industries. It places major emphasis on mathematics, chemistry, and engineering sciences in addition to courses in design and analysis, and is flexible enough to allow inclusion of courses in the liberal arts.

Typical industries that employ chemical engineers are those manufacturing petroleum, petrochemical products, plastics, heavy chemicals, environmental control systems, missiles, pulp and paper, energy, and food.

Chemical engineering students who plan to work in industrial research laboratories or to become college or university teachers should continue with graduate work toward the M.S. or Ph.D. degree.

Lower Division Courses

ChE 101,102 Chemical Engineering Orientation
3 hours fall and winter 1 ① 2 ②
Department engineering orientation.

ChE 211,212 Engineering Stoichiometry
2 hours fall and winter 1 ① 1 ②
Heat and material balances. Basic thermodynamic relationships; energy balances, and thermo-physical calculations. Prerequisite: General chemistry; Mth 113.

ChE 213 Computer-Aided Stoichiometry
2 hours spring 1 ① 1 ②
Elementary computer-aided design. Application of digital computers in complex material and energy balances. Prerequisite: ChE 102.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

ChE 313 Measurements and Instrumentation
2 hours spring 1 ① 1 ②
Principles of industrial measurement and control. Application of analog computer in industrial control. Prerequisite: Engr 221,222.

ChE 323
Chemical Engineering Problems
3 hours spring 2 ① 1 ②
Application of momentum and energy transfer phenomena for designing industrial equipment. Prerequisite: Engr 332.

ChE 401 Research
Terms and project to be arranged

ChE 403 Thesis
Terms and hours to be arranged

ChE 405 Reading and Conference
Terms, hours, and subject to be arranged

ChE 406 Projects
Terms and hours to be arranged

ChE 407 Seminar
1 hour any term 1 ①

ChE 411,412 Unit Operations (g)
3 hours fall and winter 1 ① 2 ②
Mass, momentum, and heat transfer operations; basic transport equations. Prerequisite or corequisite: Engr 313,333; Ch 425; Mth 321.

ChE 414,415
Chemical Engineering Laboratory (g)
3 hours winter and spring 1 ① 1 ④
Unit operations and transfer processes; preparation of technical reports. Prerequisite or concurrent; ChE 411; Mth 321.

ChE 425,426,427
Chemical Engineering Calculations (G)
3 hours each term 3 ①
Mathematical analysis; setting up differential equations; special methods of solving problems. Prerequisite: ChE 323; Mth 321. Concurrent: ChE 411.

ChE 431,432 Chemical Plant Design
(g) 3 hours winter and spring
1 ① 2 ②; 2 ① 1 ②
Design of plants and chemical engineering equipment. Reports required. Prerequisite: ChE 412,443; Mth 321; for ChE 432, ChE 431.

ChE 443
Chemical Reaction Engineering (G)
3 hours 2 ① 1 ②
The design of chemical reactors, comparison of performance and economic evaluatioon of reactor types. Emphasis on single phase reacting systems. Prerequisite: Mth 321.

ChE 461
Process Dynamics and Control (G)
3 hours spring 2 ① 1 ②
Fundamental principles of process dynamics and instrumentation used in control of process variables such as pressure, temperature, and flow rate. Prerequisite: ChE 412; Mth 321.

Graduate Courses

See also courses marked (g) and (G) above

ChE 501 Research

ChE 503 Thesis

ChE 505 Reading and Conference

ChE 506 Projects
Terms and hours to be arranged

ChE 507 Seminar
Terms and hours to be arranged

ChE 514 Fluid Flow
3 hours 2 ① 1 ②
Momentum transfer and related theory; special attention to recent literature. Prerequisite or parallel: ChE 425.

ChE 520,521 Diffusional Operations
3 hours winter and spring 2 ① 1 ②
Diffusion in gases, liquids, and solids; interphase mass transfer; macroscopic mass balance. Prerequisite: ChE 425.

ChE 522 Heat Transmission
3 hours 2 ① 1 ②
Mechanisms of transfer of heat energy; transport theory. Prerequisite: ChE 425.

ChE 531,532
Electrochemical Engineering
3 hours each term 2 ① 1 ②
Fuel cells, electro-organic reactions, electrodialysis and electro-winning, mass transfer and polarization, fused salt electrolysis, cell analogies, theory of electrolytic conduction, electrochemistry in nonaqueous solvents, current distribution.

ChE 535
Corrosion and Corrosion Control
3 hours 3 ①
Corrosion as an electrochemical reaction, metal activity, passivity, stress corrosion cracking, corrosion inhibitors, cathodic protection, corrosion control.

ChE 537,538
Chemical Engineering Thermodynamics
3 hours each term 2 ① 1 ②
Theory and laws governing energy transformations, phase equilibria, nonideal systems, and activities of electrolytes.

ChE 539 Thermodynamics of Irreversible Processes
3 hours 3 ①
Non-equilibrium systems with finite potential differences but restricted to time invariancy; entropy production in such systems.

ChE 540 Chemical Reactor Theory
3 hours 2 ① 1 ②
Performance of chemical reactors with emphasis on multiphase reacting systems and on nonideal flow.

ChE 550 Process Systems Analysis
3 hours 2 ① 1 ②
Mathematical formulation and computer modeling of physical and chemical processes; process system simulation and optimization by analog, hybrid, and digital computer techniques; recent advances in computer-aided process design; on-line digital computer control. Prerequisite: ChE 425, 427.

ChE 551
Process Systems Optimization
3 hours winter 2 ① 1 ②
Optimization theory. Application to computer simulated mathematical models of chemical process systems. Prerequisite: ChE 427 or equivalent.

ChE 561 Selected Topics
3 hours 2 ① 1 ②
Non-sequence course designed to acquaint students with recent advances in chemical engineering. Topics vary from term to term and from year to year. May be repeated for credit.

CIVIL ENGINEERING

The curriculum in civil engineering is designed to prepare students for a professional career in responsible engineering positions in business, industry, private consulting, and government. It includes basic sciences, social sciences, and engineering sciences in addition to engineering courses. Courses in engineering analysis and design cover the fields of structural engineering, highways and transportation systems, engineering surveying, hydraulics and water resources engineering, soil mechanics and foundation engineering, water supply, waste treatment and water pollution control, municipal engineering, and engineering planning and economy.

Graduate study leads to the M.S. or Ph.D. degree in the above fields or in ocean engineering. The growing complexity of modern engineering practice makes graduate study increasingly necessary for civil engineers who wish to specialize.

Lower Division Courses

CE 199 Special Studies
Terms and hours to be arranged

CE 226 Plane Surveying
3 hours 2 ① 2 ②
Use of engineer's transit, tape, and level; surveying methods applied to problems in construction and area survey. Prerequisite: Mth 60.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

CE 310 Computer Applications in Civil Engineering
2 hours 1 ① 1 ②
Use of "canned" programs, development of individual programs and program solutions, use of remote computer consoles. Prerequisite: sophomore standing in civil engineering.

CE 312 Hydraulics
3 hours 1 ① 2 ②
Reservoirs, dams, spillways and outlet works, open channels, water hammer, pipe networks, hydraulic machinery, economic aspects of hydraulic projects, water law. Prerequisite: Engr 302.

CE 361 Surveying Theory
3 hours 2 ① 2 ②
Use of surveying equipment, Gaussian error theory applied to measurements, calculations of position on spherical and plane surfaces, mapping techniques. Prerequisite: Mth 211.

CE 362 Photogrammetry
3 hours 2 ① 1 ③
Geometry of terrestrial and vertical photographs, radial line plotting, ground control, stereoscopy and parallax, stereoscopic plotting instruments, orientations, and aerial cameras. Prerequisite: CE 361.

CE 363 Engineering Surveys
3 hours 2 ① 1 ③
Design data and construction surveys, electronic distance measurements, precise leveling, field astronomy, property and U.S. Public Land surveys, highway earthwork and design applications. Prerequisite: CE 362.

CE 371 Soils in Engineering
3 hours 2 ① 1 ②
Uses of soils in engineering. Identification and classification. Permeability and consolidation, and applications in settlement analysis. Prerequisite: Strength of materials. Concurrent: Engr 301.

CE 372 Applied Soil Mechanics
3 hours 3 ①
Soil strength and soil mechanics theories applied to problems of slope stability, retaining structures, and foundations. Prerequisite: CE 371.

CE 381,382,383 Structural Theory
3 hours each term 2 ① 1 ②
CE 381, 382: Beam deflection, redundant structures, combined stress, columns, structural members and frames. *CE 383:* Analysis of statically indeterminate structures by moment distribution, slope deflection, strain-energy, elastic methods. Prerequisite: Mth 211; strength of materials.

CE 401 Research
Terms and hours to be arranged

CE 403 Thesis
Terms and hours to be arranged

CE 405 Reading and Conference
Terms and hours to be arranged

CE 406 Projects
Terms and hours to be arranged

CE 407 Seminar
1 hour 1 ①

CE 411 Hydrology (g)
3 hours 2 ① 1 ②
Fundamentals of hydrology; the several phases of the hydrologic cycle; special emphasis on precipitation, streamflow, hydrograph analyses, and hydrologic measurements. Prerequisite: senior standing.

CE 412 Hydraulic Engineering (G)
3 hours 1 ① 2 ②
Theory and design of hydraulic machinery and hydraulic structures. Analysis and synthesis of hydraulic systems and selected topics in hydraulic engineering. Prerequisite: CE 312.

CE 414,415 Environmental Engineering Fundamentals (g)
3 hours each term 1 ① 2 ②
Water quality analysis, water quantity measurements, hydraulic considerations, water supply and treatment, water pollution control, treatment of domestic and industrial wastes. Prerequisite: Ch 103.

CE 421,422 Transportation Engineering (G)
3 hours each term 2 ① 1 ②
Transportation planning, geometric design, traffic characteristics, roadbed design, drainage, pavement design, traffic studies, traffic control.

CE 424 Highway Materials (G)
3 hours 2 ① 1 ③
Characteristics and behavior of highway materials, pavement mixtures, and control. Prerequisite: senior standing.

CE 425 Pavement Structures (G)
3 hours 2 ① 1 ②
Design for streets, highways, and airports. Prerequisite: CE 372.

CE 451,452,453 Sanitary Engineering
(g) 3 hours each term 2 ① 1 ②
Domestic and industrial water supply and waste disposal collection, storage, pumping, and treatment facilities. Prerequisite: CE 312.

CE 461 Oregon Land Survey Law
(G) 3 hours 3 ①
U.S. Public Land Survey System; history, development, Congressional legislation, restoration of corners, and rules of evidence; Oregon supreme court decisions; adverse possession, eminent domain and riparian rights, guarantees of title, descriptions, and plats. Prerequisite: senior standing.

CE 462 Photo Interpretation (G)
3 hours 2 ① 1 ③
Air photo interpretation and application to engineering problems; factors responsible for the formation and development of man-made features and geological landforms. Prerequisite: senior standing.

CE 463 Control Surveying (G)
3 hours 2 ① 1 ③
Theory, equipment, and data reduction of electro-optical and micro-wave electronic distance measurements; control specifications, methods, and problems in obtaining large area angular measurements: precise leveling; triangulation and trilateration figure adjustments with introduction of least square techniques. Prerequisite: senior standing.

CE 471 Soil Testing for Engineers (G)
3 hours 1 ① 2 ③
Soil sampling; organization of soils laboratory; identification, permeability, consolidation and strength tests. Prerequisite: CE 372.

CE 472 Foundations for Structures (g)
3 hours 3 ①
Criteria; design of shallow and deep foundations. Prerequisite: CE 372.

CE 473 Earth Structures (g)
3 hours 3 ①
Analysis of seepage and stability for earth dams. Design and construction of embankments and earth dams and their foundations. Prerequisite: CE 372 or equivalent.

CE 481 Reinforced Concrete (g)
3 hours 2 ① 1 ②
Theory and design of reinforced concrete structural members, strength properties and control of structural concrete, design limitations and building codes. Prerequisite: CE 383.

CE 482,483 Structural Engineering (g)
3 hours each term 2 ① 1 ②
Structural design in timber, reinforced and prestressed concrete, ultimate strength and limit design. Design criteria, limitations, and detail problems. Prerequisite: CE 383,481.

CE 484 Design of Steel Structures
(g) 3 hours 2 ① 1 ②
Elastic and plastic methods of structural steel analysis, design of steel structures. Prerequisite: CE 383.

CE 485 Indeterminate Structures (g)
3 hours 2 ① 1 ②
Elastic deflections and stress analysis. Prerequisite: CE 383.

CE 489 Building Design (g)
3 hours 2 ① 1 ③
Building elements constructed of steel, reinforced concrete, timber, and miscellaneous building materials; fabrication and construction. Prerequisite: CE 472,481.

CE 490 Civil Engineering Economy
(g) 3 hours 3 ①
Time value of money; economic study techniques of construction, retirement, and replacement of civil engineering structures. Prerequisite: senior standing.

CE 492 Estimating and Contracts (g)
3 hours 2 ① 1 ②
Quantity surveying; unit prices, subcontracts, overhead costs, profits; principles and laws of contracts applied to engineering. Prerequisite: senior standing.

CE 494 Modern Construction Methods
3 hours 2 ① 1 ③
Equipment and performance factors, plant selection, productivity, and costs.

Graduate Courses

See also courses marked (g) and (G) above

CE 501 Research

CE 503 Thesis

CE 505 Reading and Conference

CE 506 Projects

CE 507 Seminar
Terms and hours to be arranged

CE 511 Engineering Properties of Soils
4 hours 4 ①
Geochemistry of soil formation, clay mineralogy, physical chemistry of clay water systems, permeability, consolidation, shear strength, and soil stabilization.

CE 512 Earth Retention and Support
4 hours 4 ①
Earth pressure theories. Earth supporting structures including walls, bulkheads, culverts, and shafts. Prerequisite: CE 472,511.

CE 513 Foundation Engineering
4 hours 4 ①
Advanced topics in analysis, design, and construction of foundations for structures, including preparation of reports. Prerequisite: CE 472,511.

CE 515 Advanced Soil Testing
3 hours 1 ① 2 ③
The direct shear test, the vacuum triaxial test, and triaxial testing of cohesive soils. Prerequisite: CE 511.

CE 516 Soil Engineering
3 hours spring 3 ①
Subsurface exploration, control of water in excavations, retaining structures, and conduits and shafts. Prerequisite: CE 512.

CE 518 Theoretical Soil Mechanics
3 hours 3 ①
Dimensional analysis and models, advanced statics of soils, soil dynamics. Prerequisite: CE 512.

CE 519 Applied Soil Mechanics
3 hours spring 3 ①
Actual problems presented as realistically as possible. Individual reports prepared. Student reports critically reviewed by other students and the instructor. Prerequisite: CE 471,473,513.

CE 520 Fluid Measurement
3 hours 1 ① 2 ③
Dynamical measurement of fluid properties and fluid motion, error analysis, instrumental systems and methods, transfer functions, transient signal analysis.

CE 521 Hydraulic Systems
4 hours 4 ①
Problems of fluid flow in closed conduits and complex piping systems. Application of numerical methods to problems in water hammer, surge tank design, and pressures in pump discharge lines.

CE 522 Fluid Mechanics
3 hours 3 ①
Dimensional analysis; principles of energy, continuity, and momentum; boundary layer theory; unsteady flow in pipes.

CE 524 Sediment Transport
3 hours 3 ①
Principles of transport in rivers and coastal waters; sediment problems associated with reservoirs. Prerequisite: CE 312.

CE 525 River Control and Utilization
4 hours 4 ①
Controlling flood flow in streams; design of dikes, shore protection facilities, retarding and impounding basins; laws of similitude; hydraulic models. Prerequisite: CE 312.

CE 526 Hydraulics of Open Channels
3 hours 3 ①
Steady, uniform, and nonuniform flow including transitions, delivery curves, side channel spillways, cavitation, and open channel surges.

CE 527 Applied Hydrology
4 hours 4 ①
Advanced treatment of hydrology covering major components of hydrologic cycle. Hydrologic analysis and design of water resource systems, flood prediction and control, simulation of surface water systems. Prerequisite: CE 411.

CE 528 Hydrology
3 hours 3 ①

CE 529 Ground Water Hydraulics
3 hours 3 ①
Steady and unsteady flow in confined and unconfined aquifiers and seepage through embankments, river depletion due to well pumping, bank storage, flow toward drains, method of images, and use of electrical and other analogs.

CE 530 Structural Model Analysis
3 hours 1 ① 2 ③
Theory, design, and construction of models for solution of stresses in continuous frames.

CE 531
Analysis of Engineering Structures
3 hours 3 ①
Stress analysis of statically indeterminate structures, energy and geometric methods.

CE 532
Matrix Methods of Structural Analysis
3 hours 3 ①
Applications of matrix algebra to problems of structural analysis, stiffness and flexibility matrices: computer applications.

CE 533 Structural Stability
3 hours 3 ①
Mathematical models of elastic and inelastic stability in structural frames, numerical methods of solution.

CE 534 Mechanics of Materials
3 hours 3 ①
Structural materials; theories of failure, multiaxial stress conditions, torsion, shear distortions, impact and vibrations, energy methods of analysis, stresses in plates and shells.

CE 535 Structural Dynamics
3 hours 3 ①
Numerical and closed-form solutions for single and multi-degree of freedom vibrating systems. Behavior of structures under dynamic forces and support motions.

CE 536
Plastic Methods of Structural Analysis
3 hours 3 ①
Formation of yield hinges, upper and lower bound theorems, equilibrium and mechanism techniques applied to redundant frames.

CE 537,538 Reinforced Concrete
3 hours each term 3 ①
Winter: Prestressed concrete, analysis and design, systems of prestressing, material specification, economics. *Spring:* Ultimate strength, theory and design.

CE 539 Plate and Shell Structures
3 hours 3 ①
Deflection and stress analysis; analysis, design, and construction.

CE 540,541,542
Sanitary Engineering Processes
3 hours each term 2 ① 1 ③
Fall and winter: Unit physical operations and biological processes of water and waste treatment. *Spring:* Advanced methods of water and waste treatment.

CE 543 Water Quality Studies
3 hours 1 ① 2 ③
Study of stream pollution, oxygen sag, reaeration, and their effects.

CE 544,545,546
Water Quality Analysis
3 hours each term 1 ① 2 ③
Chemical and physical principles of the measurement, analysis, and interpretation of the quality of water, sewage, and industrial wastes.

CE 547 Industrial Wastes
3 hours 2 ① 1 ③
Industrial processes; strength, quality, and character of industrial wastes; methods of prevention, treatment, and disposal.

CE 548 Water Quality Dynamics
3 hours 3 ①
Mass balance, convection, and diffusion in streams, lakes, and estuaries; thermal pollution, heat balance, oxygen balance, and eutrophication. Prerequisite: CE 544.

CE 549 Sanitary Engineering Design
3 hours 2 ① 1 ③
Design of water and waste water collection and treatment facilities.

CE 550
Municipal Engineering and City Planning
3 hours 3 ①
Modern city streets, boulevards, transportation systems; drainage and sanitation; water supply; lighting.

CE 551,552,553
Transportation Engineering
3 hours each term 3 ①
Engineering factors; the organization, administration, and finance of highway systems and control of traffic for ultimate efficiency.

CE 561 Photogrammetry
3 hours 2 ① 1 ③
Geometry of aerial and terrestrial photographs; design of cameras; rectification; design, construction, operation, and error theory of photogrammetric plotting instruments; analytical aerotriangulation. Prerequisite: graduate standing.

CE 562 Geodesy
3 hours 3 ①
History and properties of the spheroid; calculation of geodetic position; figure of the earth and isostasy; gravity measurement; geodetic astronomy.

CE 563 Space Surveying
3 hours 3 ①
Field astronomy; celestrial mechanics; dynamic and geometrical scientific observation and reduction of artificial satellite data; cis-lunar and lunar positions. Prerequisite: graduate standing.

CE 564 Surveying Adjustments
3 hours 3 ①
Need for adjustments; normal distribution of random errors and the least squares principle; observation and condition equations; formation of normal equations, error propagation; covariance matrix; adjustment of level nets, triangulation, traverses, and other applications.

CE 565 Analytical Photogrammetry
3 hours 3 ①
Photogrammetric coordinate systems, photograph orientation in space, condition equations, linearization of the condition equations, data analysis and normalizing of observation equations, analytical aerial triangulation, adjustment of strips and blocks. Prerequisite: CE 362.

CE 566 Ocean Position Surveying
3 hours 3 ①
Systems, uses, measurements, and accuracies of navigation and positioning methods; optical- and radio-celestial methods; circular, hyperbolic, elliptical, and azimuthal electronic methods; artificial satellite measurements; inertial and acoustic methods for surface and subsurface positioning.

CE 570 Coastal Hydraulics
3 hours 3 ①
Deep and shallow water waves; shoaling effects; tidal dynamics in bays, estuaries, and harbor entrances; wave and current forces; mixing processes; engineering considerations. Consent of instructor required.

CE 571 Forces on Marine Structures
3 hours 3 ①
Wave and current force interaction with marine structures, shoaling effects, sea ice forces, corrosion considerations. Prerequisite: CE 570.

CE 572
Marine Water Quality Dynamics
3 hours 3 ①
Water quality control and waste disposal in estuaries and near-shore areas; principles of diffusion and dispersion of dissolved and particulate matters in marine waters; fate of pollutants; interrelationships of physical, hydraulic, chemical, and biological factors. Consent of instructor required.

CE 573 Ocean Engineering Design
3 hours 2 ① 1 ②
Conceptual analysis, design, and planning of ocean systems. Team project work is stressed on functional design of near-shore and off-shore facilities. Prerequisite: CE 570.

CE 574
Ocean Engineering Facilities Planning
3 hours 3 ①
Functional planning and design criteria of near-shore and harbor facilities including piers, platforms, jetties, sea walls, groins, moorings, docks, submerged pipelines, harbor design, and use of hydraulic models. Prerequisite: CE 570.

CE 578 Marine Geotechnique
3 hours 3 ①
Marine sediment processes, beach dunes, marine soil properties, sampling and testing; seismic surveys; foundations and anchorages; marine location surveys. Consent of instructor required.

CE 579
Special Topics in Ocean Engineering
1 hour 1 ②
Special topics on various phases of ocean engineering. Subject matter selected each term on basis of student interest and available speakers. May be repeated a maximum of four times for credit.

CE 588
Advanced Wastewater Treatment
3 hours spring 2 ① 1 ③
Concepts and design including filtration, adsorption, electrodialysis, reverse osmosis, stripping, ion exchange, and distillation.

CE 590
Engineering Economic Planning
3 hours 3 ①
Planning of engineering facilities, economic analysis, selection of alternatives, benefit-cost analysis, rate structures, retirement, replacement, pricing decisions, capital budgeting for engineering objectives. Prerequisite: CE 490.

CE 593,594
Construction Engineering Management
3 hours each term 3 ①
Construction management and planning, project mobilization, contract documents, contracting procedures, legal considerations, insurance and safety requirements, project control and scheduling, selection of materials and methods, and project administration.

ELECTRICAL AND COMPUTER ENGINEERING

Two programs leading to the B.S. degree in engineering are offered by the Electrical and Computer Engineering Department. The electrical and computer engineering curriculum meets the requirements for a professional engineering degree accredited by ECPD. The computer science curriculum leading to the degree Engineering (Computer Science) requires the same lower division courses and some of the upper division courses that are required in electrical engineering, but provides additional opportunities for computer science-related course work during

the junior and senior year.

Both curricula are flexible and provide an opportunity to take additional course work in science and liberal arts. Many of the courses offered provide the student opportunity to work in the department's well-equipped laboratories and to have hands-on experience with analog, digital, and hybrid computers together with a variety of electronic and electrical engineering equipment.

Graduate study leading to the M.S. or Ph.D. degree has become increasingly important to electrical engineers who wish to specialize.

Lower Division Courses

EE 101 Engineering Orientation
3 hours 2 ① 1 ①
Techniques and methods used in defining, solving, and documenting engineering projects or problems.

EE 102 Computations in Engineering
3 hours 3 ①
Computational methods in engineering.

EE 103 Logic Systems
3 hours 3 ①
Fundamentals of binary logic in arithmetic and decision functions.

EE 199 Special Studies
Terms and hours to be arranged

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

EE 311 Transmission Systems
4 hours 3 ① 1 ②
Transmission-line circuit theory, with emphasis on wave phenomena, and introduction to electromagnetic fields. Prerequisite: Engr 222; Mth 321.

EE 312 Electric and Magnetic Fields
4 hours 4 ①
Static and quasi-static electric and magnetic fields. Prerequisite: Engr 222; Mth 321.

EE 321 Circuits
4 hours 4 ①
Transient and steady state behavior employing transforms and the complex plane. Prerequisite: Engr 222; Mth 321.

EE 322 Electronic Circuits
4 hours 3 ① 1 ③
Transient and steady-state behavior of linear electronic circuits. Prerequisite: Engr 222,323.

EE 323 Digital Circuits I
4 hours 3 ① 1 ③
Switching in electronic devices and circuits. Design and analysis of circuits in digital systems. Interconnection and noise problems. Prerequisite: EE 322.

EE 331 Energy Systems
4 hours 3 ① 1 ③
Basic principles of energy conversion and energy converters. Prerequisite: Engr 222,323.

EE 371,372
Switching and Coding Systems
4 hours each term 4 ①
EE 371: Combinational and sequential switching networks, coding systems. Prerequisite: EE 103. *EE 372:* Sequential switching networks, coding systems. Prerequisite: EE 371.

EE 401 Research
Terms and hours to be arranged

EE 403 Thesis
3 hours each term

EE 405 Reading and Conference
Terms and hours to be arranged

EE 406 Projects
Terms and hours to be arranged

EE 407 Seminar
Terms and hours to be arranged

EE 411
Electrical Engineering Economy
(g) 3 hours 3 ①
Plant investment, operation, regulation, and public relations problems, engineering management, labor relations, taxation, feasibility studies, specifications, and contracts.

EE 415 Probabilistic Methods in Electrical Engineering (g)
4 hours 4 ①
The analysis of circuits and systems with random inputs. Prerequisite: EE 321.

EE 418 System Simulation (G)
4 hours 3 ① 1 ②
Fundamentals of system simulation. Prerequisite: Engr 222.

EE 421,422 Instrumentation (G)
4 hours each term 3 3 ① 1 ③
EE 421: Fundamentals; interface with physical systems. Prerequisite: EE 323. *EE 422:* Analog and digital data acquisition systems. Prerequisite: EE 421.

EE 431,432 Power Systems (G)
4 hours each term 4 ①
EE 431: The static characteristics of electrical systems whose primary function is energy transport. Prerequisite: EE 311,321,418. *EE 432:* The dynamic characteristics of electrical systems whose primary function is energy transport. The characteristics of direct-current systems. Prerequisite: EE 431.

EE 441 Solid State Design (G)
4 hours 3 ① 1 ③
Theory, design, and construction of semiconductor devices. Prerequisite: EE 322.

EE 442 Integrated Circuit Design (G)
4 hours 3 ① 1 ③
Theory, design, and construction of integrated circuits. Prerequisite: EE 322.

EE 451 Control Engineering (G)
4 hours 4 ①
Modern control engineering. Prerequisite: EE 321.

EE 452,453 Systems (G)
4 hours 4 ①
EE 452: The systems engineering approach to analysis of large scale linear systems using state variable methods. Prerequisite: EE 321. *EE 453:* System optimization and state variable analysis of non-linear systems. Prerequisite: EE 451 or 452.

EE 461 Communications Engineering (G) 4 hours 4 ①
The transmission and detection of information in the presence of noise with both analog and digital systems considered. Prerequisite: EE 415.

EE 471 Digital Circuits II (G)
4 hours 4 ①
Analysis and design of electronic circuits used in digital systems. Prerequisite: EE 323.

EE 472 Digital Storage Systems (G)
4 hours 4 ①
The design of digital storage circuits and systems. Prerequisite: Engr 323; EE 323.

EE 473 Computer Engineering: System Organization (G)
4 hours 4 ①
The impact of software structure on hardware system design. Prerequisite: EE 371.

EE 474 Computer Engineering: System Design (G)
4 hours 4 ①
Design techniques for the synthesis of digital systems. Prerequisite: EE 371.

EE 475
Computer Engineering: Applications
(G) 4 hours 4 ①
The applications of digital systems to real world problems. Prerequisite: EE 371.

EE 481 Antennas and Propagation (G)
4 hours 4 ①
Electromagnetic wave propagation and radiation. Prerequisite: EE 312.

EE 482 Optical Electronic Systems
(G) 4 hours 3 ① 1 ②
Basic principles. Prerequisite: Engr 323; EE 312.

Graduate Courses

See also courses marked (*g*) and (*G*) above. Courses at the graduate level are given when warranted by demand.

EE 501 Research
Terms and hours to be arranged

EE 503 Thesis
Terms and hours to be arranged

EE 505 Reading and Conference
Terms and hours to be arranged

EE 506 Projects
Terms and hours to be arranged

EE 507 Seminar
Terms and hours to be arranged

E 511,512,513 Solid-State Devices
3 hours each term 2 ① 1 ③
Fall: Semiconductor device design. *Winter:* Integrated circuit design. *Spring:* Thin-film devices and circuits.

EE 514,515,516
Advanced Solid State Electronics
3 hours each term 3 ①
Properties of elemental and compound semiconductors; analytical techniques for understanding solid-state materials and devices. Prerequisite: EE 441,442.

EE 517 Selected Topics in Solid State
3 hours 3 ①
Current topics in solid-state electronics; new development and progress in optical and quantum devices, solid-state devices, integrated optical systems, and amorphous materials.

EE 521,522,523
Switching Theory and Automata
3 hours each term 3 ①
Fall: Switching and combinational circuits. *Winter:* Switching networks and sequential machines. *Spring:* Coding theory and automata.

EE 525,526,527 Computer Systems
3 hours each term 3 ①
Fall: Arithmetic, data, and information processors. *Winter:* Computer-man interface, input-output, etc. *Spring:* Digital system organization for specific areas of utilization.

EE 535,536,537 Circuits and Fields
3 hours each term 3 ①
Mathematical analysis. *Fall:* Wave propagation. *Winter:* Radiation and antennas. *Spring:* Graph theory and linear network transformations employing matrix methods.

EE 538,539,540
Analytic Techniques in Waves and Fields
3 hours each term 3 ①
Analytic techniques required for solving modern engineering problems in electromagnetics, EM wave propagation, optics, and antennas are developed and applied to illustrative problems.

EE 541,542,543 Power Systems
3 hours each term 2 ① 1 ③
Fall: Energy conversion devices in systems. *Winter:* Electrical energy transmission systems. *Spring:* Stability of systems.

EE 545,546,547
Energy Conversion Systems
3 hours each term 3 ①
EE 545: Generalized representation of electromechanical systems. *EE 546:* Excitation and control of electric machine systems. *EE 547:* Direct-energy-conversion systems.

EE 550 Introduction to Systems Theory
4 hours 4 ①
Linear systems theory, system identification and optimization. Prerequisite: graduate standing in engineering.

EE 551 Advanced Systems Simulation
4 hours 4 ①
Modern techniques of computer simulation. Prerequisite: Graduate standing in engineering.

EE 552,553 Microwave Circuits
3 hours 2 ① 1 ③
Winter: Cavities, waveguide junctions, and lossy systems. *Spring:* Propagation in inhomogeneous media, periodic structures, and non-bilateral elements.

EE 554,555 Control Systems
3 hours each term 2 ① 1 ③
Adaptive and sampled-data systems, non-linear control systems. Prerequisite: EE 560.

EE 556,557,558 Multivariable Systems
3 hours each term 2 ① 1 ③
Multivariable system analysis, synthesis, and optimization using state concepts; stability criteria; simulation; optimal control; current topics.

EE 560 Signals and Noise
4 hours 3 ① 1 ②
Stochastic processes, correlation functions, spectral analysis applicable to communication and control systems. Prerequisite: graduate standing.

EE 561,562 Communication Systems
3 hours each term 3 ①
Winter: Factors affecting the design of communication systems. Information theory, coding, detection of signals in noise. *Spring:* Digital communications. Prerequisite: EE 560.

EE 570
Switching Systems and Automata
4 hours 4 ①
Analytic techniques applicable to the design and analysis of computer systems. Prerequisite: graduate standing.

EE 579
Special Topics in Computer Systems
3 hours 3 ①
Topics to be presented at various times include: information storage and retrieval, computer architecture, fault-tolerant computing, asynchronous sequential circuits, automata, data transmission, coding theory. Prerequisite: graduate standing.

EE 581 Advanced Network Analysis
3 hours fall 3 ①
Advanced topics in network theory.

EE 582,583 Network Synthesis
3 hours winter and spring 3 ①
Synthesis of networks from prescribed driving-point and transfer characteristics. Prerequisite: EE 581.

EE 590,591,592 Systems Simulation
3 hours each term 2 ① 1 ③
Fall: Electronic analog computer uses in systems simulation. *Winter:* Numerical methods and simulation models using digital computers. *Spring:* Parameter optimization and simulation models using hybrid computers, processing of analog data. Permission of instructor required.

EE 593 Simulation Fundamentals
3 hours 2 ① 1 ③
Simulation of dynamical systems using analog, digital, and hybrid computers. Processing of analog data using hybrid computers. Prerequisite: graduate standing; differential equations.

ENGINEERING PHYSICS

The curriculum in engineering physics provides basic and advanced knowledge in physics and applied mathematics and the techniques for applying this knowledge to engineering problems. It seeks to prepare students for engineering opportunities that have roots in fundamental knowledge produced by physical research.

The student is encouraged to develop insight into the application of concepts by taking a selected core of engineering science sequences. By selecting engineering electives in analysis, synthesis, and design, he opens for himself the way to several technological areas, such as recent advances in gas- and aerodynamics, magneto hydrodynamics and plasmas, masers and lasers, radar and radioastronomy, earth and space sciences, nuclear science and engineering, material science and engineering, and in solid state physics systems development.

The program provides a foundation for graduate study in all areas of physical and engineering research based on physics and applied mathematics. Students who complete the curriculum with a B average or better should encounter no difficulties in pursuing graduate work toward an advanced degree in their field of interest in any of the major universities of this country. It has also proved to be an excellent foundation for employment in the newer technological industries that transcend the boundaries of the established engineering profession.

INDUSTRIAL AND GENERAL ENGINEERING

The industrial engineering curriculum is designed to develop engineering ability and management skills for the analysis, improvement, and control of work systems. It is people-oriented and cost-conscious.

Particular emphasis is placed on engineering and industrial management by attention to operations research, information systems, human engineering, systems analysis, engineering economy, production control, work design, project management, and quality and reliability control.

The goal of the professional industrial engineer is to produce a superior product or service at the minimum cost consistent with fair employer-employee relationships. After satisfactory experience in engineering practice, graduates should be qualified for high executive positions.

The general engineering curriculum provides the student an opportunity to follow a flexible course of study which recognizes differences in student goals and provides a maximum of choices in arriving at a high-quality engineering degree.

The curriculum includes mathematics, chemistry and physics, a broad exposure to liberal arts, and a thorough coverage of engineering sciences and conceptual design in a chosen option of engineering emphasis which meets the student's individual goals.

Within this option courses may be included in the student's program which place emphasis on management engineering, ocean engineering, architectural engineering, food engineering, biomedical engineering, water resources engineering, urban planning engineering, human engineering, engineering meteorology, and others.

The freshman year of the general engineering curriculum meets the requirements of all other engineering curricula except chemical engineering. Students who have not decided upon a major are encouraged to register in general engineering during their freshman year.

GENERAL ENGINEERING

Lower Division Courses

GE 101,102,103
Engineering Orientation
2 hours each term 1 ① 1 ②
Departmental engineering orientation.

GE 115,116,117 Graphics
3 hours each term 3 ②
Graphic communication, multiview and pictorial representation, conceptual design; spatial analysis, engineering applications; graphical analysis and solutions, industrial procedures.

Upper Division Courses

GE 401 Research

GE 405 Reading and Conference

GE 406 Projects
Terms and hours to be arranged

GE 407 Seminar
Terms and hours to be arranged
Material pertinent to senior student area of concentration.

GE 411,412,413 Analysis and Design
3 hours each term 3 ①
Problems having no unique solutions. Student initiative and ingenuity in problem analysis and synthesis in more than one area. Prerequisite: senior standing in engineering.

GE 415 Design Graphics
3 hours spring 2 ②
Use of latest methods, media, and materials in the solution of engineering and industrial design problems. Practical applications. Primarily for juniors and seniors.

INDUSTRIAL ENGINEERING

Lower Division Courses

IE 271,272,273 Mathematical Models
3 hours each term 3 ①
Models for engineering and management. Mathematical programming, inferential statistics, and simulation techniques. Prerequisite: Mth 112.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (G) may be taken for graduate credit.

IE 311,312
Electronic Data Processing Systems
4 hours each term 4 ①
IE 311: Data processing equipment and programming systems. Programming and operation of electronic calculators and computers for engineering and management applications. *IE 312:* Data processing software and management systems. Computer-aided modeling, optimization, and simulation techniques. Either course may be taken independently.

IE 361
Methods, Motion and Time Study
5 hours 2 ① 2 ②
Theory and application, work design and measurement, value-increase planning approaches, principles of motion practice, micro-motion studies, standardization and process charts, standard data and time standards.

IE 362
Production Planning and Control
4 hours 3 ① 1 ②
Forecasting techniques; network and other scheduling methods; routing, dispatching, and inspecting; machine assignment and maintenance; material and process control.

IE 365 Materials Handling
3 hours 2 ① 1 ②
Selection of equipment, its application, coordination; effect on plant layout in industrial situations.

IE 371 Systems Analysis I
5 hours 2 ① 2 ②
Appraisal and improvement of work systems for existing, modified, and newly designed operations; motion-economy principles, work count, cost analysis, paper work controls.

IE 372 Systems Analysis II
4 hours 3 ① 1 ②
Production planning, analysis, and control. Scheduling methods, materials control, project management forecasting and plant design. Prerequisite: IE 272. Corequisite: IE 273.

IE 390 Industrial Environmental Safety
3 or 5 hours
1 ② 1 ① or 1 ② 1 ① 1 ③
History, legislation, and organization of safety management. Accident costs, causes and prevention. Role of environmental and drug hazards in industrial safety. Five-hour program leads to National Safety Certificate.

IE 405 Reading and Conference
Terms and hours to be arranged

IE 406 Projects
Terms and hours to be arranged

IE 407 Seminar
Terms and hours to be arranged

IE 441 Environmental Design (G)
4 hours 3 ① 1 ②
Knowledge about human sensory, perceptual, mental, psychomotor, and other characteristics applied to the design of man-machine systems; techniques of measuring conditions affecting human behavior in operational settings; human factors in environmental design. Prerequisite: IE 272.

IE 451 Industrial Supervision Principles
(G) 3 hours 3 ①
Company, supervisor, and operator objectives and responsibilities, and their relationship to one another; solutions of case problems compared with fundamentals established by industrial leaders.

IE 455 Critical Path and Related Scheduling Methods
2 hours 1 ②
Construction of arrow networks and time charts; time/cost tradeoffs; resource leveling; line-of-balance technique; customized application to project planning and control.

IE 471,472 Management Models (G)
3 hours each term 3 ①
Analytical techniques for solution of management problems; schematic, statistical, and mathematical models; application to industrial decisions. Prerequisite: IE 372.

IE 490 Engineering Economic Analysis
(G) 3 hours 3 ①
Economic aspects of engineering decisions; techniques for decision making under conditions of uncertainty; planning and forecasting techniques and sources of planning data; evaluating intangibles, capital budgeting considerations. Prerequisite: Engineering economy or equivalent.

IE 491 Quality and Reliability Control
(G) 4 hours 4 ①
Control of quality through the use of statistical analysis; typical control techniques and underlying theory. Development of reliability models and procedures for product assurance. Prerequisite: IE 272.

IE 492
Materials Handling and Plant Layout
(G) 3 hours 2 ②
Selection of materials handling equipment; location and arrangement of facilities; economic analysis of equipment and layout alternatives; design of warehousing systems.

IE 497,498 Industrial Engineering Analysis and Design
3 hours each term 3 ①
Selection, replacement, and training of people; product design; selection and replacement of major tools, processes, and equipment; paperwork controls; subsystem revision; system or plant revision; long-run policies and strategy. Prerequisite; senior standiing.

Graduate Courses

See also courses marked (*g*) and (*G*) above

IE 501 Research
Terms and hours to be arranged

IE 503 Thesis
Terms and hours to be arranged

IE 505 Reading and Conference
Terms and hours to be arranged

IE 506 Projects
Terms and hours to be arranged

IE 507 Seminar
Terms and hours to be arranged

IE 521,522,523
Selected Topics in System Studies
3 hours each term 3 ①
Recent advances in industrial engineering pertaining to the theory and application of system studies. Analysis and design of ocean resources; evaluation, detection, extraction, processing, and marketing systems; advanced design of production systems with reference to social, economic, and regional planning; human engineering studies of man-machine systems; applications of information theory to operations research and management science. Non-sequence course. Not all topics offered each year.

IE 561 Operations Analysis
3 hours 3 ①
Appraisal and improvement of existing and proposed operational systems; work analysis and design, production planning and scheduling, forecasting and materials control. Not open to students with strong Industrial Engineering background.

IE 562 Timing Techniques
3 hours 3 ①
Modern time-study methods; allowances, skill levels, and application to case studies.

IE 563 Plant Layout
3 hours 3 ①
Selection of site, plant layout, planning building for economic production.

IE 571,572,573
Systems Theory and Cybernetics
3 hours each term 3 ①
Systems theory and cybernetics as foundation for engineering analysis and synthesis of complex systems; applications to systems involving industrial and human engineering problems; model-building for systems analysis, conversion of descriptive models into normative models, model simulation and optimization techniques, and realization and control of designed systems.

MECHANICAL ENGINEERING

The aim of the faculty and of the curriculum in mechanical engineering is the development of competent engineers who feel both a responsibility to society and a desire to practice professional engineering.

Mechanical engineering has to do primarily with the conversion and optimum utilization of energy and includes design and operation of power plants; manufacturing, aerospace, marine, automotive, heating-ventilating, and refrigeration industries; and environmental control. Specialization may be either in various fields in engineering, or in various techniques including design, analysis, instrumentation, testing, computer programming, and business and management.

Modern, air-conditioned laboratories are equipped for tests and demonstrations in thermodynamics, heat transfer, mechanics, and fluid phenomena. Special facilities are available for investigations into aerodynamics and design, experimental stress analysis, mechanics, vehicular power plants, steam generation, air and water contamination, noise control, vibration, heat transfer, instrumentation, and the characteristics of fuels and lubricants. A wave basin and wind tunnels are used for fluid mechanics research involving environmental and ocean engineering projects.

Analysis and design activities are enhanced by simulation and computational equipment such as analog, digital, hybrid, and satellite computers; peripheral, card, disk, and tape equipment; and special items.

Lower Division Courses

ME 101,102
Mechanical Engineering Orientation
3 hours each term 2 ① 1 ②
Departmental engineering orientation.

ME 206 Projects (Sophomore)
Terms and hours to be arranged

ME 262 Manufacturing Processes
3 hours 3 ①
Metal casting, welding and brazing, machining, and plastic flow of metals and nonmetals; quality control, production economy. Prerequisite: sophomore standing in engineering.

ME 271 Numerical Methods in Mechanical Engineering
3 hours 2 ① 1 ②
Numerical analysis applied to mechanical engineering problem areas: function evaluation, roots of equations, interpolation techniques, integral evaluation, simultaneous linear algebraic equations, ordinary and partial differential equations. Emphasis on methods suitable for digital computers; computer programming adaptable to OSU time-sharing system included in each area. Prerequisite: Mechanics (dynamics); Mth 321.

ME 291
Introduction to Aerospace Engineering
3 hours 3 ①
Principles of aerodynamics, performance, control, propulsion, and design.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

ME 306 Projects (Junior)
Terms and hours to be arranged

ME 311,312 Engineering Mechanics
3 hours each term 2 ① 1 ②
ME 311: Particle dynamics, vibration of single degree of freedom systems, dynamics of rigid bodies. *ME 312:* Determination of stresses, deflections, and stability of deformable bodies. Prerequisite: Mechanics (statics and strength) for ME 311; Mechanics (dynamics) for ME 312.

ME 337 Heat Engines
3 hours 2 ① 1 ②
Construction, operation, and performance of internal combustion engines with emphasis on Diesel types; fuels and lubrication; fluid torque converters; tractive resistance. Service course for forest engineering students only.

ME 351 Mechanical Laboratory
3 hours 1 ① 2 ②
Selection, calibration, and application of instruments for testing machines and processes. Analysis of test results and preparation of engineering reports. Prerequisite. Engr 312,332; Wr 121.

ME 371 Engineering Analysis
3 hours 2 ① 1 ②
Use of previous course work in making judicious analyses leading to synthesis and design. Prerequisite: Mth 321; Engr 221; Mechanics (dynamics).

ME 377 Introductory Acoustics
3 hours 2 ① 1 ②
Nature of sound, acoustics, and acoustic composition of speech, wave phenomena, phase relationships, resonance. Amplification and attenuation, noise, spectrum analysis. Laboratory demonstrations of basic acoustic principles. Service course for students in speech.

ME 381 Preliminary Design Problems
1 hour 1 ③
Widely varied projects emphasizing the determination and organization of design project requirements and criteria and their use in generating preliminary designs. Student is assigned one project at beginning of each three-hour period and submits proposed preliminary design at end of period. Prerequisite: junior standing.

ME 382 Introduction to Design
3 hours 2 ① 1 ②
Lectures on and direct involvement in mechanical design with emphasis on the importance of physical science fundamentals, flexibility of approach, and economic feasibility. Prerequisite: ME 311; Engr 221; Mth 211; ME 262.

ME 401 Research
Terms and hours to be arranged

ME 403 Thesis
3 hours any term

ME 405 Reading and Conference
Terms and hours to be arranged

ME 406 Projects
Terms and hours to be arranged

ME 407 Seminar
Terms and hours to be arranged

ME 410 Machine Design
3 hours 1 ① 2 ②
Practical aspects of industrial design. Introduces design process and phases, factors influencing design, and procedures for production design. Prerequisite: Mechanics (dynamics).

ME 411,412,413
Mechanical Analysis and Design (g)
3 hours each term 1 ① 2 ②
Systems involving mechanical, thermal, hydraulic, and electrical principles. Prerequisite: ME 311,312,371.

ME 416 Applied Mechanics (G)
3 hours 3 ①
Load-deformation relationships in elastic structures. Energy theorems and applications to structural problems. Prerequisite: ME 311,312.

ME 417,418
Statics of Deformable Structures (G)
3 hours each term 3 ①
Combined stresses, analysis of composite structures, stresses beyond elastic range, instability problems. Prerequisite: ME 416.

ME 419,420 Vibrations (g)
3 hours each term 2 ① 1 ②; 2 ① 1 ③
Dynamics applied to vibrating systems; mechanical systems with one and several degrees of freedom; continuous systems; shaft "whirl," vibration isolation, and absorption; machine balancing. Prerequisite: ME 311; ME 371.

ME 421,422
Heating and Air Conditioning (g)
3 hours each term 2 ① 1 ②
Heating, ventilating, and air conditioning of buildings for human comfort or industrial processes; design, selection, construction, and operation of air conditioning equipment, including warm air, steam, hot water, and refrigeration systems; testing of air conditioning equipment and controls. Prerequisite: Engr 313.

ME 423 Refrigeration (g)
3 hours 2 ① 1 ②
Thermodynamics; systems in use and principal characteristics of each, fundamentals of design, principal applications. Prerequisite: Engr 313.

ME 425 Fuels and Lubricants (g)
3 hours 2 ① 1 ③
Combustion theory, physical and chemical properties of solid, liquid, and gaseous fuels; application of lubricants; laboratory tests and specifications. Prerequisite: Ch 203; Ph 213.

ME 429 Transport Processes (G)
4 hours 4 ①
Momentum, energy, and mass transfer in continua. Prerequisite: Engr 332.

ME 430
Thermodynamics of DEC Devices (G)
3 hours fall 3 ①
Prerequisite: Ph 212; Engr 313.

ME 431,432 Power Plant Engineering
(g) 3 hours each term 2 ① 1 ②
Fuels and combustion equipment, steam generators and auxiliaries, and power generation equipment including combustion engines, gas turbines, hydroelectric and nuclear power plants. Economics of design and operation. Prerequisite: Engr 313.

ME 434,435
Gas Turbines and Jet Engines (g)
3 hours each term 2 ① 1 ③
Power generation, process industries, and aircraft; various cycles and component equipment including compressors, combustion chambers, gas turbines, heat exchangers; jets and ducts; gases, fuels, and high-temperature materials. Prerequisite: Engr 313.

ME 437 Mechanical Laboratory (g)
3 hours 1 ① 2 ③
Experimental methods applied to the evaluation of machines and processes. Emphasis on planning and interpretation of results. Prerequisite: Engr 313; ME 351.

ME 441 Rocket and Space Propulsion
3 hours 2 ① 1 ②
Analysis of chemical, nuclear, plasma, and ion propulsion systems and components. Prerequisite: Engr 313.

ME 450
Fundamentals of Compressible Flow (g)
3 hours 2 ① 1 ②
Fluid properties, treatment of one-dimensional steady and unsteady flows, shock waves and shock structure. Prerequisite: Engr 312,331.

ME 451,452
Aerospace Analysis and Design (g)
3 hours each term 1 ① 2 ②
Analysis and design of aerospace systems, vehicles, and components. Prerequisite: ME 441, 454,457.

ME 454,455,456 Aerodynamics (g)
3 hours each term 2 ① 1 ②
Theories of flow of perfect, compressible, and viscous fluids; application of these theories to aerodynamic design. Prerequisite: Engr 331.

ME 457 Aircraft Performance (g)
3 hours 2 ① 1 ②
Performance and flight environment of aircraft and space vehicles. Prerequisite; Engr 311; ME 311.

ME 458
Aircraft Stability and Control (g)
3 hours 2 ① 1 ②
Development of the theory of static aircraft stability and control and an introduction to dynamic stability and response to controls. Prerequisite: ME 457.

ME 460
Mechanical Engineering Economy (g)
3 hours 3 ①
The time value of money as it affects alternative engineering proposals, financial aspects of common investments. Prerequisite: senior standing.

ME 470,471,472
Mechanical Engineering Analysis (G)
3 hours each term 3 ①
Problems solved by use of advanced mathematical methods. Prerequisite: Mth 321.

ME 474 Analog Computers (g)
3 hours 2 ① 1 ④
Electronic operational analog equipment used in the solution of mathematical equations common to engineering; network analyzers, digital computers, and membrane and conducting sheet analogies. Prerequisite: Mth 321; Ph 213.

ME 476 Industrial Instrumentation (g)
3 hours 2 ① 1 ③
Process instrumentation and system analysis in automatic process control; applications to the analysis and design of pneumatic, hydraulic, electric, and electronic control devices. Prerequisite: ME 371.

ME 477
Measurement and Control of Sound (g)
3 hours 2 ① 1 ②
Sound generation and propagation; measurements and analysis; acoustical characteristics of materials and configurations; design to reduce noise levels. Laboratory use of sound and vibration measuring equipment to obtain information for analysis of problem situations. Prerequisite: ME 351.

ME 480,481,482
Dynamics of Physical Systems (g)
3 hours each term 2 ① 1 ③
Analysis and synthesis of dynamic systems containing mechanical, electrical, thermal components. Modeling, mathematical analysis, and computer and laboratory simulation. Prerequisite: Engr 221,312,332; ME 311.

ME 490 Air Sanitation (g)
3 hours fall 2 ① 1 ②
Definition and study of air pollution and the factors affecting it. Engineering, chemical, meteorological, social, and economic aspects of atmospheric pollution and its control. Prerequisite: senior or graduate standing.

ME 491,492,493
Automotive Engineering (g)
3 hours each term 2 ① 1 ③
Fuel Air Cycle analysis of piston type internal combustion engines, combustion analysis; performance parameters, testing and analysis; design analysis of automotive chassis components; dynamics of steering, braking, and suspension systems. Tractive effort and tractive resistance forces; fuel consumption of vehicles; exhaust emission testing and analysis; future engines and transportation systems. Prerequisite: Engr 313, 332; ME 311.

Graduate Courses

See also courses marked (g) and (G) above

ME 501 Research
Terms and hours to be arranged

ME 503 Thesis
Terms and hours to be arranged

ME 505 Reading and Conference
Terms and hours to be arranged

ME 506 Projects
Terms and hours to be arranged

ME 507 Seminar
Terms and hours to be arranged

ME 514,515 Mechanical Design
3 hours each term 3 ①
Systematic approach, from first suggestion of the need through preliminary steps leading to initial design; the design itself; cursory treatment of the development, redesign, testing, manufacturing, and servicing aspects.

ME 516,517 Systems Engineering
3 hours each term 1 ① 2 ②
The preliminary design of a complex system by student teams starting with the statement of the problem to be solved, extending through feasibility studies to the identification of subsystems and their various interactions. Design topics change each year.

ME 522 Air Conditioning Design
3 hours 3 ①
Commercial air conditioning systems including cost estimation, writing of specifications, and selection of controls; economics of fuels, equipment selection, and specialized systems; air purification and odor control and relation to puhlic health.

ME 525,526 Thermodynamics
3 hours each term 3 ①
Concepts and postulates of thermodynamics and their consequences as applied to a wide variety of situations. Thermodynamic modeling of real situations.

ME 527 Conduction Heat Transfer
3 hours 3 ①
Analytical, numerical, and analog solutions to steady state and transient conduction problems.

ME 528 Radiation Heat Transfer
3 hours 3 ①
Analytical and numerical methods of solution of thermal radiation problems.

ME 529 Convection Heat Transfer
3 hours 3 ①
Analytical, numerical, and analog solutions to convection problems together with a discussion of pertinent literature of experimental work.

ME 530 Heat Transfer Laboratory
3 hours 1 ③
Problems in heat transmission; heat transfer systems. Prerequisite: ME 527.

ME 531
Selected Topics in Thermodynamics
3 hours 3 ①
Topics in thermodynamics selected from the following or related material: Application of thermodynamic concepts and postulates, thermodynamics of irreversible processes, coupling of thermodynamics with statistical mechanical property calculation methods, phenomenological statistical thermodynamics. Prerequisite: ME 525,526.

ME 532 Fuel Technology
3 hours 2 ① 1 ③
Production, manufacture, distribution, and application of fuels, including natural gas; liquefied petroleum gas; gasoline; jet; diesel; heavy burner fuels; and high energy rocket-engine fuels. Laboratory test methods for manufacturing control and prediction of performance.

ME 534 Gas Turbine Design
3 hours 2 ① 1 ③
Fields of application, design of compressors, combustion chambers, turbines, heat exchangers, ducts, and nozzles; design of gas turbine unit for a specific application, including auxiliary equipment; components tested in laboratory.

ME 546,547,548 Gas Dynamics
3 hours each term 3 ①
Dynamics and thermodynamics of gaseous flow fields including steady and unsteady, reacting and non-reacting, one and two dimensional flow; applications to current problems in subsonic to hypersonic flight. Prerequisite: ME 450.

ME 550 Continuum Mechanics
3 hours 3 ①
Kinematics and governing field laws for continua. Applications to fluid dynamics, elastic and inelastic solids, and electromagnetic continua.

ME 551,552 Elasticity
3 hours each term 3 ①
Basic equations of linear elasticity with emphasis on physical interpretation; exact and approximate solutions with applications to engineering problems. Prerequisite: ME 550; concurrent registration in Mth 416 recommended.

ME 554 Plasticity
3 hours 3 ①
Stress-strain relations, perfectly plastic materials, strain hardening materials, metal forming processes. Prerequisite: ME 550.

ME 555 Viscoelasticity
3 hours 3 ①
Characteristics of various viscoelastic materials. Spring damper models, hereditary integrals. Simple stress problems. Extension to two and three dimensions, general deformation laws. Vibration, impact, buckling. Prerequisite: ME 550.

ME 557
Incompressible Fluid Mechanics
3 hours 3 ①
Generalized fluid mechanics; principal methods of fluid dynamics; hydrostatics, kinematics of liquids and gases; methods of description, geometry of the vector field, acceleration of a fluid particle, continuity equation; dynamics of nonviscous fluids; Eulerian reference, potential motion, two-dimensional potential motion, vortex motion, energy and momentum theorems. Prerequisite: ME 550.

ME 559
Selected Topics in Fluid Mechanics
3 hours 3 ①
Boundary layer stability, transition prediction methods, computational methods in fluid mechanics, recent developments. Not all topics covered each year. Prerequisite: ME 557. May be repeated for credit.

ME 560 Experimental Mechanics
3 hours 2 ① 1 ③
Stress analysis by strain measurement—mechanical, optical, and electrical strain gages; brittle coating techniques; strain gage instrumentation; piezoelectric, capacitive, and inductive transducers; stress analysis by x-ray diffraction.

ME 561,562 Optical Stress Analysis
3 hours each term 2 ① 1 ③
Photoelasticity; photoelastic coating techniques, photoplasticity, three-dimensional photoelasticity, interferometric methods, Moiré techniques, grid methods.

ME 566,567,568 Advanced Dynamics
3 hours each term 3 ①
Fall: Dynamics of particles, rigid bodies, and systems. Generalized coordinates, Hamilton's principle, Lagrange's equations; applications to planetary motions; variational principles applied to performance optimization. *Winter:* Vibrations of discreet and continuous systems. Transfer functions, normal coordinates; response to impulsive loading; wave propagation. *Spring:* Motions of non-linear systems. Free, forced, and self-excited oscillations in mechanical and electrical systems with non-linear characteristics; stability of dynamic systems.

ME 573 Numerical Methods for Engineering Analysis
3 hours 3 ①
Numerical solution of equations, matrix algebra, difference equations, interpolation, numerical integration, roots of equations, and Monte Carlo Methods. Emphasis on methods suitable for digital computers.

ME 574 Operational Analog Computer
3 hours 1 ① 2 ③
Solution of problems not readily solved by analytical methods. Emphasis on solution accuracy.

ME 590
Fundamentals of Air Sanitation
3 hours 2 ① 1 ③
The air pollution problem and factors affecting it; properties, sampling, and analysis of atmospheric pollutants.

ME 591,592 Measurement and Control of Air Pollutants
3 hours each term 2 ① 1 ③
Atmospheric chemistry; pollutants and control measures; winds, thermal effects, and atmospheric cleaning.

ME 593
Selected Topics in Air Sanitation
3 hours each term 3 ①
Aerosol technology, electrostatic cleaning processes, air quality studies, statistical analysis of atmospheric data. Not all topics covered each term.

ME 595 Industrial Hygiene
3 hours winter 2 ① 1 ③
Man and his health as a function of his work environment; evaluation and control of environmental hazards.

METALLURGICAL ENGINEERING

The metallurgical engineer deals with materials such as metals, ceramics, and alloys from which such products as motors, vehicles, houses, and artificial limbs are made. New developments in science, engineering, and technology—in atomic power, space travel, worldwide comunication, computerization, and automation—require thorough knowledge of the properties of materials and skill in handling and fabricating them to provide maximum performance at minimum cost.

The curriculum in metallurgical engineering is as fundamental and broad as a four-year course of study will permit. Each year the student may choose unrequired courses that meet his interests and occupational objectives.

The wide variety of positions open to the metallurgical engineer includes: planning and supervision of the production of materials; planning and supervision of the fabrication of materials into finished products; selection of materials and investigation of failures, either as a staff member of an engineering department or as an engineering consultant; applied research directed toward the development of better materials, better manufacturing processes, or better design procedures; and fundamental research on the structure and behavior of materials.

Lower Division Course

MetE 201 Introduction to Metallurgical Engineering
3 hours 3 ①
Sources of metals, chemical principles of metallurgical processes: pyrometallurgy, hydrometallurgy, electrometallurgy, structure of solids, alloys, physical properties of metals and alloys, methods for altering physical properties of metals and alloys.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

MetE 401 Research
Terms and hours to be arranged

MetE 403 Thesis

MetE 405 Reading and Conference

MetE 406 Projects
Terms and hours to be arranged

MetE 407 Seminar
1 hour

MetE 411,412,413 Metals and Ceramics Applications Engineering (G)
3 hours each term 3 ①
Recent developments and applications in engineering materials; materials selection, specifications, and design implications. *MetE 411:* Ferrous metals and alloys. *MetE 412:* Nonferrous metals and alloys. *MetE 413:* Nonmetallic materials. Prerequisite: Engr 322.

MetE 421,422 Transformation, Structure, and Properties of Alloys (G)
4 hours each term 3 ① 1 ③
Internal structure, constitution, heat treatment, physical and mechanical properties of ferrous and nonferrous metals and alloys. Prerequisite: Engr 322.

MetE 425 Metallurgical Equipment and Measurements
3 hours 2 ① 1 ③
Instrumentation and equipment used in the processing of refined metals, including: melting, casting, heat treating, and mechanical forming; laboratory equipment and techniques used in the study of metals. Prerequisite: Engr 322.

MetE 431 Unit Operations in Metallurgical Engineering (G)
3 hours 2 ① 1 ③
Physical separation of metallic minerals from their ores. Crushing, grinding, heavy fluid separation, froth flotation, magnetic separation. Prerequisite: senior standing in engineering.

MetE 432 Unit Processes in Metallurgical Engineering (G)
3 hours 2 ① 1 ③
Applications of chemical and thermodynamic principles to the unit processes of extractive metallurgy. Heat, material and energy balances, slag chemistry, hydrometallurgy, electro-metallurgy, ingots, plastic deformation processes. Prerequisite: Engr 322; Ch 340; MetE 431.

MetE 433 Process Metallurgy (G)
3 hours 2 ① 1 ③
Integration of unit operations and unit processes in the design of metallurgical plants. Raw material and energy supplies; transportation, storage, and handling of raw materials and products; waste disposal; instrumentation and control. Prerequisite: MetE 431,432.

Graduate Courses

See also courses marked (*g*) and (*G*) above

MetE 501 Research

MetE 503 Thesis

MetE 505 Reading and Conference

MetE 506 Projects

MetE 507 Seminar
Terms and hours to be arranged

MetE 511,512 X-Ray Metallography
3 hours each term 2 ① 1 ③
The space lattice; diffraction of X-rays by crystals; experimental techniques in X-ray diffraction; effects of plastic deformation on diffraction patterns; radiographic inspection of metal castings and welds. Prerequisite: Engr 321.

MetE 521 Crystal Imperfections
3 hours 3 ①
A detailed study of crystal defects and the influence of such defects on the mechanical and physical properties of engineering materials. Point, line, and surface defects and their interactions. Prerequisite: MetE 422.

MetE 524 Diffusion and Kinetics
3 hours 3 ①
Reaction kinetics in solid solutions; mathematics of diffusion, experimental techniques for obtaining diffusion data, theories of atomic mechanisms, interpretation of diffusion data, diffusion in nonmetals. Prerequisite: MetE 422.

MetE 527 Phase Transformations
3 hours 3 ①
Phase changes in metals and alloys; nucleation theory, growth processes, spinodal decomposition, martensitic transformations, precipitation hardening. Prerequisite: MetE 422.

MetE 531 Mechanical Metallurgy
3 hours 3 ①
Response of metals to applied forces; elements of elasticity, plasticity, advanced strength of materials, crystal deformation and dislocations; applications to testing and plastic working of metals. Prerequisite: Engr 322.

MetE 545,546,547
Selected Topics in Materials Science
3 hours each term 3 ①
Theory of alloy phases, solid state reactions, liquid metals and solidification, strengthening mechanisms in solids, mechanisms of flow and fracture in metals, point and line defects, physical properties of metals. Not all topics covered each year. Consent of instructor required.

MetE 552
Metallurgical Crystallography
3 hours 3 ①
Symmetry operations and repetition theory, algebra of operations, point groups and crystal classes, space groups, use of the International Tables for X-ray crystallography. Prerequisite: MetE 511.

MetE 555
Electron Microscopy in Material Science
3 hours 2 ① 1 ③
Principles, methods, and applications of electron microscopy and electron diffraction to solids. Consent of instructor required.

MetE 556
Advanced Electron Microscopy
3 hours 2 ① 1 ③
Electron diffraction; dark field techniques, kinematic theory of image contrast; dynamical theory of image contrast; applications to problems in engineering and science. Prerequisite: MetE 555.

MetE 561
Metallurgical Thermodynamics
3 hours 3 ①
Fundamental thermodynamic principles, solutions, activities, phase equilibria, metal-vapor and metal-liquid reactions, and solid state reactions. Special emphasis given to metallurgical problems. Prerequisite: undergraduate thermodynamics or physical chemistry.

NUCLEAR ENGINEERING

The nuclear engineering curriculum is designed to provide personnel for nuclear power plant operation, design of nuclear facilities, and research and development programs dealing with nuclear energy. Particular attention is directed toward application of scientific principles to both design and operation of nuclear installations. In addition, emphasis is

provided in nuclear instrumentation, systems of control, materials of construction, economy of operation; and, particularly, safety and regulation in nuclear operations.

Excellent facilities are available for the instructional program at the Radiation Center, including TRIGA III, and AGN 201 nuclear reactors. Instruction is integrated with an extensive research program, with opportunities to participate at both the undergraduate and graduate levels.

Lower Division Courses

NE 101,102
Nuclear Engineering Orientation
3 hours 2 ②
Concepts and problems in nuclear engineering.

NE 103
Introductory Nuclear Engineering
3 hours 2 ① 1 ②
Broad look at nuclear industry including principles of reactors, uses of nuclear energy, isotopes and radiation, radiation effects, and environmental considerations in nuclear engineering and technology.

NE 201 Nuclear Energy Fundamentals
3 hours fall 3 ①
The building blocks of atomic nuclei; mass-energy equivalence and nuclear binding energy, radioactivity, fission, fusion, nuclear energy units.

NE 202 Nuclear Radiation and Matter
3 hours winter 2 ① 1 ②
Interaction of radiation and matter: nuclear reactions and transmutations; ionizing radiation, chemical effects of radiation, effects on solids; biological effects; sources of natural background.

NE 203 Nuclear Radiation Detection and Measurement
3 hours spring 1 ① 1 ④
Principles and mechanisms underlying nuclear radiation detection and measurement investigated. Most common stationary and portable detectors and electronic circuits for signal processing studied. Check-out, calibration, and application emphasized.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

NE 309
Social Problems in Nuclear Energy
3 hours 3 ①
History of nuclear energy; early discoveries; the Manhattan project, early reactors, and the bomb; developments abroad; organization and function of AEC; development of reactors and nuclear power; economic factors in nuclear power; safety and environmental issues; international arrangements for development and control; NPT and safeguards.

NE 341 Nuclear Fuel Cycle
3 hours fall 3 ①
Processes within nuclear industry which deal with exploration, mining, and purification of uranium and thorium; conversion to special compounds; enrichment; fuel fabrication; reactor fuel storage, shipment, reprocessing, and waste management. Prerequisite: Ch 203 or 206.

NE 409
Nuclear Engineering and Nuclear Energy
3 hours 3 ①
Introduction to the field for nonmajors. Reactor concepts and types, reactor operation and analysis, radiation safety, nuclear fuel cycles, nuclear power generation, uses of isotopes and radiation.

NE 421,422,423 Nuclear Reactor Analysis and Computation
(G) 4 hours each term 4 ①
Mathematical analysis of the behavior of nuclear reactors based upon physical models; steady-state homogeneous and heterogeneous reactors, transient behavior. Computational analysis using digital computers to solve nuclear reactor engineering problems. Prerequisite: Mth 322 and FORTRAN.

NE 441,442
Nuclear Reactor Experiments (G)
3 hours each term 1 ② 1 ④
Experiments using the TRIGA reactor; steady-state and transient behavior of reactors; reactor physics experiments; measurement of neutron flux distribution, age, moderator albedos; nuclear physics experiments.

NE 461,462 Reactor Thermohydraulics and Power Generation (g)
3 hours each term 3 ①
Heat transfer and fluid flow analysis of reactors. Heat transfer rates, power distribution and critical heat fluxes in single and two-phase coolant systems. Descriptions, operating characteristics, and power generation in boiling water, pressurized water, gas-cooled, and fast reactor systems. Preliminary system design considerations. Prerequisite: Engr 322.

NE 463 Reactor Design (g)
3 hours 3 ②
Numerical and analytical calculations and design of components and systems within a nuclear power plant.

NE 464 Reactor Safety Engineering
(g) 3 hours 3 ①
Pertinent federal and state regulations regarding nuclear safety sources and quantities of radioactive material; radioactive effluent control, general safety design criteria, classes of accidents, accident calculations, and environmental effects.

NE 481 Nuclear Materials (g)
3 hours 3 ①
Role in a reactor; fuel, moderator, reflector, shielding, coolant, control, and structural; nuclear properties; radiation effects on metallic materials; metallurgy of uranium, thorium, and plutonium. Prerequisite: NE 211; Ph 313.

Graduate Courses

See also courses marked (*g*) and (*G*) above

NE 501 Research
NE 503 Thesis
NE 505 Reading and Conference
NE 507 Seminar
Terms and hours to be arranged

NE 511,512,513
Advanced Nuclear Reactor Analysis
3 hours each term 3 ①
Mathematical study of behavior based upon certain approximate physical models; steady state homogeneous and heterogeneous reactors, reactor kinetics, and control rod theory.

NE 521
Reactor Environmental Problems
3 hours 3 ①
Federal and state regulations concerning environmental effects of nuclear power plants; development of the analytical techniques for calculating effects of release of gaseous and liquid radioactive effluents, effects of thermal discharges, atmospheric dilution and dispersion, and cost-benefit studies.

NE 522 Reactor Safety Problems
3 hours winter 1 ③
Outstanding reactor safety problems such as those addressed in Safety Analysis Reports: nuclear and thermal transients associated with reactor excursions, fuel failure, release of radioactivity to the environment, effectiveness of emergency systems. Formulation of analytic models, critical review of assumptions and conditions, discussion of methods of solution and results.

NE 523 Advanced Reactor Design
3 hours 1 ① 2 ②
Advanced analysis and design of nuclear power systems.

NE 531 Nuclear Reactor Kinetics
3 hours 3 ①
Time behavior of nuclear reactors; development of kinetics equations, reactor core control theory, reactivity feedbacks.

NE 532 Reactor Economics
2 hours 2 ①
Engineering economic analysis of power reactors and nuclear fuel cycles: capital cost ranges, indirect costs, present worth of future improvements in systems; technological learning curves and economies of scale in the nuclear industry; fuel cycle unit costs and cost trends; financing practices.

NE 534 Power Reactor Dynamics
3 hours 3 ①
Stability and control of power reactor systems; thermohydraulic and power-demand feedbacks, stability of different reactor types, nuclear system control practices and their analysis.

NE 535 Nuclear Reactor Burnup
2 hours 2 ①
Theory and computation of isotope and reactivity changes during operation of a nuclear power reactor. Changes in flux behavior and engineering constraints on control. Reloading schemes.

NE 552,553 Computational Methods for Nuclear Reactors
3 hours each term 3 ①
The application of digital computers to problems in nuclear engineering. Numerical solution of nuclear reactor equations. Topics include multi-group diffusion theory, kinetic equations, Monte Carlo methods, S_n, P_1 methods; criteria for selecting methods, and computer programming.

Engineering Technologies

Curricula leading to the B.S. or B.A. degree in engineering technology are offered in several departments of the School of Engineering. Engineering technology is intimately associated with engineering but has the distinct objective of preparing students to bring engineering designs to accomplishment through construction, management, and operations.

The curricula provide a balance of courses in science, liberal arts, business or business-oriented subjects, and engineering technology. The 192 term hours of study can be completed in four years if the student has the necessary background in physics, chemistry, and mathematics. Students who have not taken these prerequisite courses in high school frequently plan their course of study on a five-year basis. In this way they gain the advantage of being able to take additional electives in their areas of interest. As in engineering, a good command of English and writing acquired in high school is helpful to the technology student.

Students who wish to receive particular information in regard to any of the technology curricula should direct inquiries to the departments concerned.

Agricultural Engineering Technology

See SCHOOL OF AGRICULTURE

Civil Engineering Technology

The technology curriculum offered in the Department of Civil Engineering is based on mathematics and the physical sciences but also includes courses in the liberal arts and business administration, because civil engineering technologists work closely with people and business ventures. Technology courses emphasize engineering mechanics, engineering materials, surveying, construction methods and management, engineering economy, estimating, and cost control.

If a student takes the major option in construction, he has an opportunity, through cooperation with the Associated General Contractors, to gain practical field experience during the summer months.

Lower Division Courses

CET 111,112,113 Technical Problems
2 hours each term 1 ① 1 ②
Elementary technical problems related to civil engineering field, methods of work, use of slide rule, graphical representation.

CET 121 Drawing and Descriptive Geometry
3 hours 1 ① 2 ②
Fundamentals of engineering drawing, orthographic projection, study of lines, planes, and solids.

CET 221,222,223 Plane Surveying
3 hours each term 2 ① 2 ②
CET 221: Care and use of theodolite, transit, level, electronic distance measuring equipment, and tapes; effect of errors of observations; traverse and area surveys; machine computations. *CET 222:* U.S. public land survey system; metes and bounds descriptions; deeds as legal documents; use of state plane coordinate systems; theory of adjustment of survey equipment. *CET 223:* Stadia and other tachymetry methods; topographic mapping techniques; profile surveys; borrow pit and highway earthwork measurement and estimates. Prerequisite: Mth 102.

CET 232 Civil Engineering Drawing
3 hours winter 1 ① 2 ③
Drawing techniques applied to civil engineering projects. Prerequisite: CET 121.

CET 252,253,254 Mechanics: statics, dynamics, strength of materials
3 hours each term 2 ① 1 ②
Fundamental concepts of mechanics applied to elementary civil engineering problems. Prerequisite: Mth 112 previously or concurrently with CET 252. Courses to be taken in sequence.

CET 261 Fundamentals of Estimating
3 hours fall 2 ① 1 ②
Principles of estimating, classification of work, types of estimates, quantity take-off techniques. Prerequisite: CET 113,232.

Upper Division Courses

CET 321,322 Hydraulics
3 hours 2 ① 2 ②
CET 321: Pressure and energy concepts of fluids, fluid measurements, flow in pipes and open channels. *CET 322:* Pump characteristics and selection, elements of hydrology, storm runoff, drainage, culvert selection. Prerequisite: CET 253.

CET 334,335,336 Highway Location and Control Surveying
3 hours each term 2 ① 1 ③; 2 ① 1 ③; 1 ① 2 ③
CET 334: Geometry of highway location: circular, compound vertical, and spiral curves; field problems. *CET 335:* Curve problems in highway design, earth distribution analysis, preliminary office studies, and paper location procedures, machine compilation of field data. *CET 336:* Second-order control surveys by traverse and triangulation, three-wire leveling astronomic determination of position. Prerequisite: CET 223.

CET 341,342,343 Construction Materials Laboratory
3 hours each term 2 ① 1 ③
CET 341: Origin of soils, standard soil tests for engineering projects. *CET 342:* Standard tests for structural elements, timber, steel, concrete. *CET 343:* Highway materials standard tests, asphalt, concrete, base and subbase materials.

CET 362 Estimating and Cost Control
3 hours winter 2 ① 1 ③
Quantity surveying, establishment of unit prices, overhead, profits; concrete, steel, and timber. Prerequisite: CET 261.

CET 371 Construction Engineering Economy
3 hours fall 3 ①
Engineering economy used as a decision-making tool to evaluate proposed investments in money terms; use of compound interest and depreciation calculations to compare the relative economy of alternatives in construction engineering.

CET 381 Project Scheduling
3 hours spring 2 ① 1 ③
Computer coding and computer applications to project scheduling and critical path methods.

CET 405 Reading and Conference

CET 406 Projects

CET 407 Seminar
Terms and hours to be arranged

CET 441,442,443 Construction Methods and Control
3 hours each term 2 ① 1 ③
CET 441: Earth moving, grading, classifications, methods, and equipment. *CET 442:* Construction of concrete, steel, and timber structures, specific construction projects and equipment; equipment maintenance.

CET 447,448,449 Photogrammetry and Construction Surveys
3 hours each term 1 ① 2 ③
CET 447: Terrestrial photogrammetry, aerial cameras, geometry of the aerial photograph, ground control requirements and principles of radial-line plotting and planimetric mapping, mosaics. *CET 448:* Orientation of a photograph, stereoscopy and parallax, geometry of overlapping vertical photographs, rectification of tilted photographs, stereoscopic plotting instruments, oblique photography, point identification. *CET 449:* Theory and practice in construction survey problems; highways, buildings, and special situations; evaluation of different methods and equipment used. Prerequisite: senior standing.

CET 451,452 Structural Problems
4 hours winter, spring 2 ① 2 ③
Study and design of building elements of concrete, steel, and timber; detailing and fabrication. Prerequisite: CET 254.

CET 461 Contracts and Specifications
3 hours fall 2 ① 1 ③
Laws of contracts as applied to engineering work; correlation of blueprints and specifications.

Mechanical and Manufacturing Engineering Technology

The manufacturing engineering technology curriculum offered by the Department of Mechanical and Metallurgical Engineering prepares students for responsible positions in the manufacturing industries which include planning, control, supervision, and management of manufacturing. It includes the same basic requirements as the mechanical engineering technology curriculum. In addition, an emphasis is included on business and personnel management, engineering economy, engineering materials, manufacturing processes and their control. Areas of specialization include: metal industries, welding and fabrication, casting of metals, tool design and process industries. The program is designed to meet the needs of modern industry. Field trips and opportunities for summer job experience are emphasized.

The mechanical engineering technology curriculum in the Department of Mechanical and Metallurgical Engineering focuses upon heating and air conditioning, refrigeration, power plant and power conversion, metallurgy and materials, internal combustion engines, mechanical design, and instrumentation and control systems. Instruction stresses application in laboratory courses. Students should confer with an adviser to determine an appropriate area of specialization within the technology.

Lower Division Courses

ME 101 Mechanical Engineering Technology Orientation
3 hours 2 ① 1 ②
Scope of technology and positions of the technologist in relation to the scientist and the engineer; logical solution to problems; familiarization with equipment; use of common instruments and devices for problem solution.

MT 201 Mechanisms
3 hours 1 ① 2 ②
Analysis of mechanisms and linkages, kinematics of machines. Prerequisite: MT 212.

ME 211,212,213 Introduction to Mechanics
3 hours each term 2 ① 1 ②
Application of the principles of mechanics to predict the effects of forces on mechanical systems. Prerequisite: Mth 111.

MT 220 Mechanical Analysis
3 hours 2 ① 1 ②
Application of differential and integral calculus to basic geometrical and physical problems. Determination of areas, volumes, centroids, mean values, moments of inertia. Prerequisite: Mth 111.

MT 240 Cast Metal Processes
3 hours 2 ① 1 ③
The advantages and limitations of castings including economics, use, design, and production of commercial ferrous and non-ferrous castings, including the several sand, ceramic, investment, permanent mold, and die casting processes as related to the engineer-technologist.

MT 250 Welding and Fabrication
3 hours 2 ① 1 ③
Welding processes and methods of fabrication and construction of machines and structures. Arc and gas welding and cutting, resistance welding and brazing as applied to ferrous and non-ferrous metals. Forming, forging, and heat treatment of steel. For engineering technology students.

MT 260 Machine Tool Practice for Engineers
3 hours 2 ① 1 ③
Fundamentals of machine tool work and metal cutting and manufacturing processes, basic machine tool processes and their application in manufacturing for the economic production of products.

MT 265 Machine and Tool Maintenance: Metals
3 hours 2 ① 1 ③
Maintaining metalworking and mechanical equipment, tool and cutter sharpening, lubrication and power transmission. Prerequisite: MT 260.

Upper Division Courses

MT 301,302,303 Metallurgy and Materials
3 hours each term 2 ① 1 ②
Structure and properties of engineering materials; modification of properties through changes in structures; effect of service environments on properties and stability of materials; metallic, organic, and ceramic materials and processes.

MT 316 Industrial Wood Processes
5 hours 3 ① 2 ③
Application of mass production concepts to production woodworking using techniques of production planning, jigs, and fixtures for assorted projects. Production methods for applying finishes to wood and metal parts for decoration and protection.

MT 321,322,323 Applied Heat Power
4 hours each term 2 ① 2 ②
Energy and power sources and methods of conversion; laws governing gases, vapors, processes, cycles, fuels, and combustion; operation and testing of mechanical equipment including fans, blowers, pumps, compressors, boilers and burners, engines and turbines, heat exchangers, refrigeration, and air conditioning systems; instrumentation, testing procedures, and evaluation of performance tests on heat power machinery. Prerequisite: Ph 202; Ch 105; MT 212.

MT 366 Numerical Control Technology
3 hours 3 ①
Application of numerical control to manufacturing processes and product design, control systems for machine tools, manual and computer-assisted programming techniques for point-to-point and continuous-path machining. Prerequisite: Mth 102; ME 262 or MT 260.

MT 367 APT Numerical Control Programming
3 hours 3 ①
APT systems applied to continuous path machining on milling, turning, and other operations; computer-aided design and manufacturing techniques with respect to APT systems; selected problems. Prerequisite: MT 366.

MT 368 Metrology and Quality Control Technology
5 hours 3 ① 2 ②
Measurement and quality control in modern manufacturing. Concepts of geometric and true position dimensioning and fundamentals of metrology and statistical quality control. Prerequisite: MT 260 or ME 262.

MT 381 Preliminary Design Problems
1 hour 1 ③
Projects emphasizing determination and organization of design project requirements and criteria and use in preliminary designs. Student is assigned project at beginning of each three-hour period and submits proposed preliminary design at end of period. Prerequisite: junior standing.

MT 405 Reading and Conference

MT 406 Projects

MT 407 Seminar
Terms and hours to be arranged

MT 411,412,413 Mechanical Design
3 hours each term 1 ① 2 ②
Application of principles of mechanism, mechanics, and strength of materials to design of machine elements and mechanical systems. Prerequisite: MT 201,213,381.

MT 421,422 Air Conditioning and Ventilation
3 hours each term 2 ① 1 ③
Calculation of heating and cooling loads, air and temperature distribution, properties of dry and moist air; air washers and humidity control, heating and refrigerating requirements, matching components and systems characteristics. Prerequisite: MT 323.

MT 423 Refrigeration and Heat Pumps
3 hours 2 ① 1 ③
Vapor compression refrigeration cycles, direct expansion and brine-cooled cooling coils, condensing units and cooling towers, heat pumps, and heat sources, controls and operation of vapor compression systems, adsorption refrigeration systems. Prerequisite: MT 421,424.

MT 424 Refrigeration
3 hours 1 ① 2 ③
Operation, maintenance, and trouble shooting of refrigeration systems. Prerequisite: MT 323.

MT 425 Mechanical and Electrical Equipment of Buildings
3 hours 2 ① 1 ③
Mechanical and electrical equipment of buildings, especially for those interested in their installation, adjusting, and maintenance; checking and maintaining typical equipment; field trips. Prerequisite: MT 323; Sys 203.

MT 426 Automatic Control Systems
3 hours 2 ① 1 ③
Process instrumentation and system analysis in automatic process control; operation of various types of control systems. Prerequisite: MT 323.

MT 428 Refrigeration for Food Processing and Preservation
3 hours 2 ① 1 ③
Refrigeration systems, cooling-load calculation, system controls, plant layout, and problems in plant construction and operation in food processing and preservation. Prerequisite: MT 424.

MT 429 Special-Purpose Refrigeration Systems
3 hours 2 ① 1 ③
Heat pumps, air cycle systems, absorption refrigeration cycle, low temperature systems, and systems used for solidification and liquification of gases. Prerequisite: MT 424.

MT 431,432,433 Power Plants
3 hours each term 2 ① 1 ③
Power plants and energy conversion systems; installation and operation of the equipment; steam, internal-combustion engine, gas turbine, hydroelectric, nuclear, solar, and others; fuels and combustion, heat transfer, fluid flow, and auxiliary equipment; field trips. Prerequisite: MT 323.

MT 435 Power Plant Economics
3 hours 2 ① 1 ③
Construction, operating, and maintenance costs of power plants; fuel, labor, maintenance, and overhead items; accounting systems. Prerequisite: MT 432.

MT 444,445 Casting and Patternmaking Processes
4 hours each term 3 ① 2 ③
Problems in production patterns, factors influencing pattern cost; casting techniques applied to ferrous, nonferrous, and reactive metals; foundry raw materials and controls; quality control as influenced by design; melting and sand practices; special molding methods; gating, risering, and solidification. Prerequisite: MT 240.

MT 454 Production Welding
5 hours 3 ① 2 ③
Techniques applied to ferrous and nonferrous metals; typical production welding jobs; design and use of production welding devices—jigs, fixtures, forming, and handling equipment; welded product design and construction, including the engineering and economic problems. Prerequisite: MT 250.

MT 464,465 Mass Production Methods
5 hours each term 3 ① 2 ③
Mass production methods applied to metal cutting and forming, ceramics, and plastics; processes and factors involved in selection and setup of machines and equipment for production manufacturing; jigs, fixtures, and dies; job shop methods and quality control. Prerequisite: MT 260 or ME 262.

MT 466 Automated Manufacturing Technology
3 hours 3 ①
Principles, practices, and economics of application of automated manufacturing techniques to the metalworking and other industries. Prerequisite: ME 262 or MT 465.

MT 481,482,483 Metallography
3 hours each term 2 ① 1 ③
Metallographic laboratory technique; preparation of samples; the metallurgical microscope, photomicrography; macroscopic examination; pyrometric practice; thermal analysis; radiographic technique; special metallurgical tests. Prerequisite: MT 303.

MT 491 Internal Combustion Engines
3 hours 2 ① 1 ③
Cycles, mechanical and thermodynamic; engine construction, operation, and performance; fluid flow as applied to carburetion; fuel systems and combustion in spark-ignition and compression-ignition engines; electrical systems; lubrication fundamentals. Prerequisite: MT 323.

MT 492 Automotive Chassis
3 hours 2 ① 1 ③
Construction of and design of automobile chassis and driveline components; purpose, function, operation, and performance. Prerequisite: MT 212, 323.

MT 493 Automotive Performance
3 hours 2 ① 1 ③
Performance of vehicles; tractive effort and tractive resistance, steady state fuel consumption, exhaust emissions, and performance prediction of trucks. Prerequisite: MT 492.

MT 494 Fleet Operation
3 hours 2 ① 1 ③
Economics of motor fleet operation; cost analysis, vehicle taxation, preventive maintenance practices, laws governing size and weight restrictions, fuel economy, and tractive ability as applied to equipment selection.

MT 495 Fuel and Lubricant Technology
3 hours 2 ① 1 ③
Properties and application of fuels and lubricants to combustion devices and machines. Prerequisite: Ch 105; Ph 203 or equivalent.

Nuclear Engineering Technology

Nuclear engineering technology provides preparation for entering the rapidly expanding field of nuclear power generation. Emphasis is upon safety regulations, operational requirements, instrumention, and control. Operational experience is available on an AGN 201 reactor, and a TRIGA III reactor, all located at the Radiation Center. Since nuclear technology changes rapidly, close l'aison is maintained with industry in all aspects of nuclear development. Nuclear engineering technology bears the same relationship to nuclear engineering as do the other technologies to their corresponding engineering fields.

Lower Division Courses

NT 101,102
Nuclear Engineering Orientation
3 hours 2 ②
Concepts and problems in nuclear engineering.

NT 103
Introductory Nuclear Engineering
3 hours 2 ① 1 ②
Broad look at nuclear industry, including principles of reactors, uses of nuclear energy, isotopes and radiation, radiation effects, and environmental considerations in nuclear engineering and technology.

NT 201 Nuclear Energy Fundamentals
3 hours fall 3 ①
The building blocks of atomic nuclei; mass-energy equivalence and nuclear binding energy, radioactivity, fission, fusion, nuclear energy units.

NT 202 Nuclear Radiation and Matter
3 hours winter 2 ① 1 ②
Interaction: nuclear reactions and transmutations, ionizing radiation, chemical effects of radiation, effects on solids, biological effects, sources of natural background.

NT 203 Nuclear Radiation Detection and Measurement
3 hours spring 1 ① 1 ④
The principles and mechanisms; most common types of stationary and portable detectors, electronic circuits for signal processing. Checkout, calibration, and application emphasized.

Upper Division Courses

NT 301,302,303
Elementary Reactor Engineering
3 hours each term 3 ①
Nuclear power systems with emphasis on the reactor and its associated control and instrumentation; properties of reactor materials including strength of materials and their relationship to design, corrosion of materials and its relationship to long-term operation. Includes identification of the nuclear steam generator components, the nuclear steam supply system, and the secondary power recovery system. Prerequisite: NT 101, 102,103.

NT 311,312 Radiation Protection
4 hours each term 3 ① 1 ②
Basic principles with particular emphasis on radiation protection instrumentation use and calibration, radiation dosimetry, shielding for radiation protection, design of radiation monitoring programs, radiation protection equipment and techniques, radioactive waste management, biological effects of radiation, transportation of radioactive materials, etc.

NT 405 Reading and Conference
NT 406 Projects
NT 407 Seminar
Terms and hours to be arranged

NT 410 Field Practice No credit
Between the junior and senior years, arrangements will be made for off-the-campus assignments of students in industrial nuclear plant locations. These assignments will be designed to give practical experience in a segment of the nuclear power industry and its associated equipment supply industries. Senior standing required.

NT 411 Nuclear Rules and Regulations
3 hours 1 ① 1 ②
The regulatory phase of the nuclear field, including the history of the regulatory programs, organization and responsibilities of regulatory agencies, pertinent rules and regulations and their application; early and current radiation protection standards and organizations responsible for their formulation will provide necessary background information.

NT 412 Nuclear Safety Analysis
3 hours 3 ①
Safety analysis of operations involved in the use of ionizing radiation, neutrons, and radiation producing devices; safety analysis of nuclear reactor installation for either research purposes or power production; and safety analysis of novel uses of radioisotopes in industrial operations. Prerequisite: NT 311,312.

NT 413
Nuclear Plant Environmental Impact
3 hours spring 1 ① 1 ②
The physical, social, economic, and legislative factors influencing the environmental impact of nuclear power plants. Emphasis given to topographic, geologic, seismic, hydrologic, meteorologic, demographic, and aesthetic aspects as well as to cost-benefit-analyses and state and federal regulations.

NT 431,432
Nuclear Power Plant Technology
4 hours fall, winter 2 ②
Technological aspects of nuclear power plants with emphasis on light water reactors, high temperature gas-cooled reactors, and liquid metal fast-breeder reactors. Nuclear, thermo-mechanical, electrical plant systems; plant operations.

NT 491,492
Nuclear Technology Experiments
3 hours each term 1 ② 1 ④
Operation of the TRIGA reactor for steady-state and transient experiments. Reactor characteristics and operating behavior, reactor mechanisms checkout and associated technology.

Systems Technology

The Electrical and Computer Engineering Department in cooperation with the Industrial and General Engineering Department offers a curriculum in systems technology. The information system option places major emphasis on generation, transmission, processing, and management of data such as found in computers, telephone and power systems, research organizations, business firms, government agencies, and health care facilities. By emphasizing data processing subjects, students can prepare for national examination and registration administered by the Institute for Certification of Computer Professionals. The electric system option places major emphasis on understanding of overall systems problems dealing with electrical signals and energy. Early emphasis is given to systems fundamentals and their application. The inclusion of economics, business, and data processing complement the systems fundamentals. Flexibility is provided so the students may tailor their course of study to their interest and talents.

Lower Division Courses

Sys 101,102,103 Systems Technology
2 hours each term 1 ① 1 ②
Fundamentals of systems technology.

Sys 201,202,203
Circuits, Instrumentation, and Systems
3 hours each term 1 ① 2 ②
Electrical circuit fundamentals, system analysis, characteristics of electrical instrumentation. Prerequisite: Sys 103.

Upper Division Courses

Sys 301,302,303 Electrical Equipment
3 hours each term 1 ① 2 ②
Characteristics of various electrical equipment, evaluation of total cost of operation. Prerequisite: Sys 203.

Sys 311,312,313 Electrical Instruments and Protective Equipment
3 hours each term 1 ① 2 ②
Principles of electrical instruments, electrical measurements, and electrical circuit protection; characteristics of electrical circuit protective devices. Prerequisite: Sys 203.

Sys 406 Projects
Terms and hours to be arranged

Sys 411,412,413
Information Systems Design
3 hours each term 3 ①
Data structures; information management; analysis and design of information systems; data processing management functions; evaluation of hardware including microfilm, videotape, electronic calculator, digital and analog computers; advanced systems management techniques and procedures. Prerequisite: Sys 203.

Sys 421,422,423
Electrical Power Generation, Transmission, and Distribution
3 hours each term 1 ① 2 ②
Principles and economic evaluation of various methods. Prerequisite: Sys 303, Sys 313.

For description of courses in Agricultural Engineering Technology, see SCHOOL OF AGRICULTURE

FORESTRY

FACULTY

As of January 1974

CARL HENRY STOLTENBERG, Ph.D., Dean of the School of Forestry

DALE NESTRUD BEVER, M.F., Assistant Dean, Professor

RUDOLPH MARTIN KALLANDER, M.F., Assistant Dean, Professor

WILLIAM PERRY WHEELER, Ph.D., Head Adviser, Professor

JOHN HERMAN BEUTER, Ph.D., Director of School Forests, Associate Professor

MARVIN LAVERN ROWLEY, B.S., Manager of School Forests, Instructor

JAMES THEODORE KRYGIER, Ph.D., Coordinator, Forestry Extension, Professor

PHILLIP ELLIS CRAWFORD, M.B.A., Coordinator of Forestry Instructional Services, Instructor

JAMES LAFAYETTE OVERHOLSER, M.F., Editor of Forestry Publications, Assistant Professor

PROFESSORS EMERITUS Barnes, Davies, Jaenicke, Jeffers, Kangur, Yoder

Forest Engineering: PROFESSORS Davies, Jemison, O'Leary
ASSOCIATE PROFESSORS Brown (department head), Aulerich, Froehlich, Gay, R. Wilson
ASSISTANT PROFESSORS Berglund, Harr, K. Johnson
INSTRUCTORS Dykstra, Garland, McLaren, Rowley

Forest Management: PROFESSORS Dilworth (department head), Bell, Berg, Bever, Ching, Dunn, Ferrell, Hermann, Lavender, Overton, Reichart, Robinson, Wheeler
ASSOCIATE PROFESSORS Beuter, Black, Hooven, Hopkins, Irgens-Moller, Newton, Paine, Sutherland, Waring, Zaerr
ASSISTANT PROFESSORS Cleary, Downing, Sander, Streeby
INSTRUCTOR Crawford

Forest Products: PROFESSORS Resch (department head), Atherton, McKimmy, West
ASSOCIATE PROFESSORS Bublitz, Corder, Currier, Graham, J. Johnson, Krahmer, Laver, McMahon, Van Vliet, Wellons
ASSISTANT PROFESSORS Kozlik, Miller, Polensek, Schuldt, J. Wilson
INSTRUCTOR Jordan

Resource Recreation Management: PROFESSORS Heath (department head), Slezak
ASSOCIATE PROFESSOR Milliken
ASSISTANT PROFESSORS Freed, Jackson, Reed
INSTRUCTOR Nolan

THE GENERAL AIM OF THE SCHOOL OF FORESTRY is to provide opportunity for a quality liberal and professional education. A specific aim is the development of students as individuals, citizens, and professional men and women to enable them to serve society effectively.

Forests constitute Oregon's most valuable natural resource. The forest industry is the backbone of the state's economy. Oregon's forest environment is world renowned for scenic beauty and recreational attractions.

Oregon State forestry graduates are well equipped to participate in developing and managing the forest-based water, wood, wildlife, recreation, and forage resources of the state and nation. They are employed throughout the world in harvesting forest crops; in developing, processing, and marketing wood products; in managing forests and related resources; in teaching; in extension; and in research.

Forestry is a demanding and highly satisfying profession with a wide range of opportunities for qualified men and women, including those from minority groups. The School, which is accredited by the Society of American Foresters, helps its students locate seasonal as well as permanent employment.

Departments and Degrees

Through its four departments the School offers the Bachelor of Science (B.S.) or Bachelor of Forestry (B.F.) degree in Forest Engineering, Forest Management, and Forest Products, and the B.S. or Bachelor of Arts (B.A.) degree in Resource Recreation Management.

It is possible to cmplete requirements for more than one option within a department or to earn degrees in two departments if programs are carefully planned.

High School Preparation

Students planning to major in the School of Forestry should include the following subjects in their high school program: English, four years; mathematics, four years including trigonometry and advanced algebra; chemistry, one year; physics, one year; graphics or mechanical drawing, one year.

Entrance

All new students must satisfy Oregon State University and School of Forestry requirements for entrance. Prospective freshmen take either the Scholastic Aptitude Test (SAT) or the American College Test (ACT).

Transfer students who do not have academic credit for college-level mathematics will also take the appropri-

ate placement test if mathematics is required in the departmental major. Deficiencies shown by this test should be removed before enrolling in the prescribed courses in mathematics. Transfer students should realize that problems of scheduling sequence and prerequisite courses may require them to spend additional time to complete their programs.

Appropriate courses from accredited schools will be accepted without examination to fulfill the School's curricular requirements. Courses in forestry subjects from institutions with unaccredited forestry programs may be accepted only after the student demonstrates an adequate grasp of the subject matter concerned by examination or other adequate evidence. Transfer credits in general education courses accepted by the University may be used to satisfy the School's general education requirements. The School does not grant credit for work done in vocational or technical training programs.

Graduation

Academic requirements:

204 hours of university-level courses including:

- Written communication ..... 9 hours
- Oral communication ..... 6 hours
- Humanities, arts, and social sciences ..... 17 hours
- Physical and biological sciences ..... 24 hours
- Completion of an approved departmental curriculum.

At registration each new student will designate the department in which he or she wishes to major. To transfer to another department later, a student should consult his or her faculty adviser. A change in major may involve additional time to complete curricular requirements.

Professional and personal requirements

The School of Forestry is recognized nationally for its strong educational program, for its personal interest in students and their development, and for graduates who perform effectively and responsibly as professionals.

The School's personnel program provides assistance and incentive, but success is dependent on the individual. Students are personally responsible for fulfilling all curricular requirements in proper sequence. Work performance and personal conduct are thoroughly appraised by the School. Since forestry is highly regarded for its ethical and its academic standards, students are responsible for observing the Honor Code of the School in its entirety. Departure from these ethical requirements may be reason for terminating a student.

No summer camp is required. Those majoring in Forest Management, Forest Engineering, or Forest Products must complete six months of satisfactory employment in the area related to their major.

Educational Facilities

Corvallis is one of the largest forestry research centers in America. Peavy Hall, the new OSU forestry building, contains 84,000 square feet of floor space for modern classroom, laboratory, and study facilities. An aggressive research program is conducted by the School through its Forest Research Laboratory and by the campus-based Forest Sciences Laboratory of the U.S. Forest Service. These facilities offer splendid educational and employment opportunities for superior students.

The School makes extensive use of various public and private forestry programs and facilities for student benefit. Numerous field trips to forest and wood-processing plant operations, recreation facilities, and research areas enable students to observe contemporary problems and practices. Classes use the nearby School forests for daily field instruction. In addition to these 11,000 acres in the McDonald and Dunn Forests, the School manages other forests in Benton and Columbia counties for education and research.

University Honors Program

Students with exceptional scholastic abilities will be interested in the honors seminars of the School of Forestry. Information concerning the program may be obtained from faculty advisers. See also UNIVERSITY HONORS PROGRAM in this catalog.

Curricula in Forestry

FOREST ENGINEERING

Accredited by Society of American Foresters

FOUR-YEAR CURRICULUM

Freshman Year

	Hours
General Botany (Bot 201,202)	8
Mathematics (Mth 110,111,112)	12
Chemistry (Ch 201,202,203)	9
English Composition (Wr 121)	3
Introduction to Forestry (F 111)	4
Dendrology (F 254)	4
Physical education	3
Defense education or electives	8
	51

Sophomore Year

	Hours
Forest Engineering (FE 123)	3
Forest Engineering (FE 223)	4
Aerial Photointerpretation (F 220)	3
Mensuration (F 224)	5
Wood Technology and Utilization (FP 210)	4
General Physics (Ph 201,202)	8
Basic Geology (G 221)	3
Principles of Economics (Ec 213,214)	8
Defense education or other electives	13
	51

Junior Year

Forest Engineering (FE 323)	4
Northwest Logging (FE 360)	4
Logging Roads (FE 361)	3
Forest Management Operations (F 432, 433)	9
Mechanical Properties (FP 321)	4
Accounting (BA 211,212)	8
Mathematical Models (IE 271,272)	6
Electives	13
	51

Senior Year

Watershed Management (FE 424)	3
Logging Plans (FE 461)	5
Logging Transportation (FE 462)	5
Logging Costs (FE 463)	5
Seminar (FE 407)	1
Production Planning and Control in Logging (FE 481)	4
Forest Economics and Regulation (F 434, 435)	8
Business Law (BA 315)	4
[1]Personnel Management (F 415 or BA 467 or BA 361)	3
Electives	13
	51

FIVE-YEAR CURRICULUM

First Year

See Freshman Year above

Second Year

	Hours
Forest Engineering (FE 123)	3
Forest Engineering (FE 223)	4
Aerial Photointerpretation (F 220)	3
Mensuration (F 224)	5
Wood Technology and Utilization (FP 210)	4
General Physics (Ph 201,202,203)	12
Calculus (Math 113, 211)	8
Defense education or other electives	9
	48

[1] Not required of students completing 18 term hours of upper division military courses.

Third Year

Forest Engineering (FE 323)	4
Mechanics of Solids (GE 211,212,213)	9
Basic Geology (G 221)	3
Applied Differential Equations (Mth 321)	3
Accounting (BA 211,212)	8
Principles of Economics (Ec 213,214)	8
Electives	13
	48

Fourth Year

Northwest Logging (FE 360)	4
Logging Roads (FE 361)	3
Forest Management Operations (F 432,433)	9
Mathematical Models (IE 271,272)	6
Mechanics of Fluids (GE 301,302)	6
Structural Theory (CE 381,382,383)	9
Reinforced Concrete (CE 481)	3
Electives	9
	49

Fifth Year

Logging Plans (FE 461)	5
Logging Transportation (FE 462)	5
Logging Costs (FE 463)	5
Seminar (FE 407)	1
Prod Plan and Cont in Logging (FE 481)	4
Forest Econ and Reg (F 434,435)	8
Watershed Management (FE 424)	3
Structural Engineering (CE 483)	3
[1] Prsnnl Mgmt (F 415 or BA 467 or BA 361)	3
Business Law (BA 315)	4
Electives	9
	50

[1]Not required of students completing 18 term hours of upper division military courses.

Forest Management

Accredited by Society of American Foresters

Freshman Year

	Hours
General Botany (Bot 201,202)	8
Mathematics (Mth 110,111,112 or Mth 161,162,163)	12
Chemistry (Ch 201,202,203)	9
English Composition (Wr 121)	3
Introduction to Forestry (F 111)	4
Dendrology (F 254)	4
Physical education	3
Defense education or electives	8
	51

Sophomore Year

	Hours
General Physics (Ph 201,202, or 211,212)	8
Principles of Economics (Ec 213,214)	8
Plant Physiology (Bot 330)	4
Soils (Sls 210)	5
Aerial Photointerpretation (F 220)	3
Forest Engineering (FE 222)	5
Mensuration (F 224)	5
Wood Technology and Utilization (FP 210)	4
Defense education or other electives	10
	52

Junior Year

Basic Meteorology (AtS 300)	3
Forest Pathology (Bot 415)	3
Forest Entomology (Ent 423)	3
Forest Ecology (F 341)	5
Forest Biometrics (F 327)	5
Forest Engineering (FE 423)	5
Forest Recreation (F 364)	3
Range Resources (Rng 341) or Wildlife Conservation (Wld 251)	3
Business elective	4
Electives	17
	51

Senior Year

Watershed Management (FE 424)	3
Forest Management Operations (F 432,433)	9
Forest Econ and Reg (F 434,435)	8
Multiple-Use Decisions (F 436)	4
Seminar (F 407)	1
Prsnnl Man (F 415 or BA 361 or BA 467)	3
Business elective	4
Electives	18
	50

Optional programs are available to those students who desire to pursue an area of emphasis in forest business, forest recreation, or forest science.

FOREST BUSINESS

This option differs from the standard program in forest management by requiring BA 211, BA 212, BA 238, BA 311, BA 312, BA 313, and BA 414 or BA 315. The student elects Bot 415 or Ent 432. The option does not require Rng 341 or Wld 251. Also available is a management concentration in business administration—see your adviser for details.

FOREST RECREATION

This option requires LA 280, LA 290, Wld 251, F 365, and F 464 in addition to the standard program in forest management.

FOREST SCIENCE

This option differs from the standard program in forest management by requiring one more term of physics, Mth 110,111,112, a year of foreign language, a term of statistics, and 15 hours of approved science electives. It does not require F 220, F 327, F 364, F 436, FE 423, FE 424, or any business electives.

Forest Products

WOOD INDUSTRY MANAGEMENT OPTION

Freshman Year

	Hours
General Botany (Bot 201,202)	8
Mathematics (Mth 110,111,112 or Mth 161,162,163)	12
Chemistry (Ch 201,202,203)	9
English Composition (Wr 121)	3
Introduction to Forestry (F 111)	4
Dendrology (F 254)	4
Physical education	3
Defense education or electives	8
	51

Sophomore Year

	Hours
General Physics (Ph 201,202)	8
Principles of Economics (Ec 213,214)	8
Accounting (BA 211,212)	8
Wood Technology and Utilization (FP 210)	4
Mensuration (F 224)	5
General hygiene	2
[1]Defense education or approved electives	16
	51

Junior Year

Quantitative Methods (BA 235)	4
Introduction to Management Science (BA 238)	4
Wood Anatomy (FP 311)	4
Introduction to Wood Chemistry (FP 370)	4
Physical Properties of Wood (FP 314)	4
Mechanical Properties I (FP 321)	4
Logging Methods (FE 392)	3
Mechanical Conversion I (FP 441)	4
Approved electives	20
	51

Senior Year

Mechanical Properties II (FP 422)	4
Mechanical Conversion II (FP 442)	4
Pulp and Paper Processes (FP 443)	4
Wood Industry Problems (FP 452)	3
Forest Products Merchandising (FP 453)	4
Forest Economics and Regulation (F 434, 435)	8
Seminar (FP 407)	1
Approved electives	23
	51

WOOD SCIENCE OPTION

A *wood science* option offered by the Forest Products Department differs from the wood industry management option in that the following courses are not required: BA 211, 212, 235, 238; F 224, 434, 435; FE 392; FP 452, 453. Additional courses required in the wood science option are: Ph 203; Mth 113, 211; St 451, 452, 453; one year of organic chemistry; and approximately 30 elective hours in courses related to biological, physical, chemical and engineering sciences. Mth 110,111,112 is required.

[1] Approximately 30 elective hours are required in courses related to business and technology, economics, industrial engineering, or production management.

Resource Recreation Management

Freshman Year

	Hours
Biological Science	12
English Composition (Wr 121)	3
Foundations of Recreation and Leisure (RR 171)	5
Introduction to Forestry (F 111)	4
Physical education	3
Personal Health (H 160)	2
Written communication	3
Oral communication	3
Approved humanities and arts	3
Approved social science	9
Electives	4
	51

Sophomore Year

Science	12
Leisure and Ecology (RR 261)	3
Park and Recreation Area Analysis (RR 281)	5
Courses chosen from one option (below)	3
Approved social sciences	12
Approved humanities and arts	9
Electives	7
	51

Junior Year

Socio-Psychological Concepts of Leisure (RR 321)	4
Supervised Field Experiences (RR 351, 352)	4
Courses chosen from one option (below)	20
Approved social sciences	9
Approved humanities and arts	6
Electives	8
	51

Senior Year

Phil and Hist Basis of Leisure (RR 421)	4
Internship (RR 412)	12
Courses chosen from one option (below)	16
Electives	19
	51

Options

ENVIRONMENTAL INTERPRETATION

	Hours
Soils and Men (Sls 100)	3
Geology (G 200)	3
Geology Laboratory (G 204,205)	2
Prin of Wildlife Conservation (Wld 251)	3
Conservation of Natural Res (F 260)	3
Systematic Botany (Bot 321)	4
Bioecology (GS 331)	3
Leisure and Environ Values (RR 391)	3
Conflicts in Forest Conservation (F 460) (g)	3
Environmental Interpretation (RR 493) (g)	3
Interpretive Methods and Site Development (RR 496) (g)	3

OUTDOOR RECREATION

	Hours
Physical Geology (G 200)	3
Aerial Photointerpretation (F 220)	3
Conservation of Natural Resources (F 260)	3
Landscape Design (LA 290,291)	6
Organization and Management Theory (BA 302)	3
Forest Recreation (F 364)	3
Forest Recreation Planning (F 365)	3
State and Federal Recreation (RR 371)	3
Real Estate Law (BA 414)	3
Land and Water Econom (AEc 461) (g)	3
Outdoor Recreation Policy (RR 473) (g)	3
Outdoor Recreation Devel (RR 475) (g)	3

PARK ADMINISTRATION

	Hours
Soils and Men (Sls 100)	3
Basic Horticulture (Hort 215)	3
Conservation of Natural Resources (F 260)	3
Landscape Design (LA 290,291)	6
Lawn and Turfs (ACS 313)	2
Plant Materials (LA 326)	3
Behavior in Organizations (BA 361)	4
Park Systems Planning and Development (RR 381)	3
Public Administration (PS 412) (g)	3
Conflicts in Forest Conserv (F 460) (g)	3
Park Operations (RR 483) (g)	3
Park Management (RR 485) (g)	3

Courses in Forestry

FOREST ENGINEERING

The Forest Engineering curriculum prepares students to perform a wide range of engineering operations associated with the management of forest lands. These include designing and constructing roads, bridges, and other structures; developing logging plans; and adapting logging systems which will aid in achieving quality resource management.

Students are trained to analyze and evaluate engineering systems in order to integrate the mechanical and economic requirements of forest operations with the biological requirements of the forest and the need to protect soil and water resources. The curriculum includes courses in engineering, business, forest management, watershed management, and operations research. A student may complete additional courses in forest management and earn degrees in both departments or continue with a fifth year in forest engineering. Forest engineering graduates are employed by private forestry firms and public forestry agencies. Some establish their own consulting business after a few years of field experience.

Through the Graduate School, the department offers the Master of Science (M.S.), the Master of Forestry (M.F.), and the Doctor of Philosophy (Ph.D.) degrees.

Lower Division Courses

FE 123 Forest Engineering
3 hours fall 2 ① 1 ④
Measurement of distance, direction, and elevation. Prerequisite: trigonometry. WILSON.

FE 222 Forest Engineering
5 hours fall or spring 3 ① 1 ⑥
Measurement of distance, direction, and elevation; topographic surveying; stadia; plane table; computation and plotting of field data. For forest management majors. Prerequisite: trigonometry and engineering drawing. WILSON.

FE 223 Forest Engineering
4 hours winter 2 ① 1 ⑥
Topographic surveying; direct and indirect leveling; computing and plotting of field data; stadia and plane table. Prerequisite: FE 123; engineering drawing. WILSON.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

FE 323 Forest Engineering
4 hours spring 3 ① 1 ④
Public land survey; polar and solar observation; triangulation; electronic surveying equipment; trilateration; Lambert grid system; theodolites. Prerequisite: FE 222 or FE 223. O'LEARY.

FE 360 Northwest Logging
4 hours winter 2 ① 1 ⑥
A basic course in logging methods and equipment with particular application to the Pacific Northwest. Prerequisite: Mth 111; F 224; FE 222 or FE 223. O'LEARY.

FE 361 Logging Roads
3 hours winter 2 ① 1 ③
Design of logging roads. Prerequisite: F 220; G 221. WILSON.

FE 392 Logging Methods
3 hours winter 2 ① 1 ③
Relation between logging and forest production; felling and bucking; skidding, loading, hauling; relative merits of various methods. AULERICH.

FE 401 Research
Terms and hours to be arranged

FE 403 Thesis
Terms and hours to be arranged

FE 405 Reading and Conference
Terms and hours to be arranged

FE 406 Projects
Terms and hours to be arranged

FE 407 Seminar
Terms and hours to be arranged

FE 423 Forest Engineering (g)
5 hours fall 3 ① 1 ⑥
Public land survey; triangulation; Lambert grid system; logging road reconnaissance and surveys; horizontal and vertical curves; earthwork; road design. For forest management students only. Prerequisite: FE 222. AULERICH.

FE 424 Watershed Management (g)
3 hours winter or spring 2 ① 1 ②
Understanding the impact of logging, roadbuilding and other forest uses on water quality and quantity in forest streams as a basis for land use decisions. Prerequisite: senior standing. HARR.

FE 461 Logging Plans (g)
5 hours fall 2 ① 1 ③ 1 ⑥
Basic logging plans; analysis of timbered areas for development of logging operations; preliminary transportation plans. Prerequisite: FE 323,360,361. O'LEARY.

FE 462 Logging Transportation (g)
5 hours winter 2 ① 1 ③ 1 ⑥
Working plans from data obtained in FE 461; development of transportation systems. Prerequisite:FE 461. DAVIES.

FE 463 Logging Costs (g)
5 hours spring 2 ① 1 ③ 1 ⑥
Management control; economic theory of location and construction; costs of surveys, construction, operation, and maintenance. Prerequisite: FE 462; FP 321. O'LEARY.

FE 481 Production Planning and Control in Logging (G)
4 hours spring 3 ① 1 ③
Collecting and analyzing field data. Mathematical models of cost and performance of principal phases of logging. Work scheduling procedures; inventory control; mechanics of yarding; new and experimental logging equipment; simulation; linear programming. Prerequisite: IE 272; FE 360 or FE 392. AULERICH.

Graduate Courses

See also courses marked (g) or (G) above.

FE 501 Research

FE 503 Thesis

FE 505 Reading and Conference

FE 506 Projects
Terms and hours to be arranged

FE 507 Seminar
Terms and hours to be arranged
Subject matter as required by graduate programs.

FE 519 Photogrammetry
3 hours winter 1 ② 2 ③
Use of multiplex and Balplex plotters in topographic mapping and road location. Prerequisite: F 220; FE 423. Offered alternate years. PAINE.

FE 534 Forest Hydrology
3 hours winter 2 ① 1 ③
Interception, transpiration, evaporation, and sedimentation with emphasis on aspects dealing with forest practice as related to stream flow. Prerequisite: F 424. Offered alternate years. Offered 1974-75.

FE 535
Water Quality and Forest Land Use
3 hours fall 3 ①
Water quality parameters; analytical methods; land use effects; municipal watershed management. Prerequisite: F 424. Offered alternate years. Offered 1974-75.

FE 536
Environmental Measurement Techniques
3 hours spring 2 ① 1 ③
Principles of design, evaluation, and operation of sensor-recorder systems suitable for measuring environmental parameters of temperature, humidity, wind, and radiation with particular reference to the forest environment. Prerequisite: AtS 482. GAY.

FE 560 Logging Methods
4 hours 2 ① 1 ⑥
Studies of current development in logging methods and equipment. O'LEARY.

FE 561,562,563 Logging Engineering
5 hours each term 2 ① 1 ③ 1 ⑥
Logging plans and timber transportation systems. O'LEARY.

FOREST MANAGEMENT

The successful forest manager is more than a tree specialist. He must understand and use the biological, social, political, and economic forces that affect natural resource policies and actions. The forest management curriculum includes basic courses in the biological, physical, and social sciences, plus professional courses designed to prepare students to protect, regenerate, and harvest the forest resources on a multiple-use basis. In addition to the standard program, students have the opportunity to pursue specialized interests through options in forest business, forest recreation, and forest science. However, graduates of all options meet minimum educational requirements as professional foresters.

The forest business option provides additional background in business and managerial science such as accounting, production, marketing, and personnel administration. The recreation option is for those students interested in managing the forest environment for many uses,

but with special attention to recreational benefits. The forest science option prepares the student for graduate work in pathology, entomology, ecology, physiology, genetics, and other science areas. Graduates in forest management are employed by the forest industry, U.S. Forest Service, Bureau of Land Management, State Forestry Departments, and county and municipal agencies.

The Master of Science (M.S.), Master of Forestry (M.F.) and Doctor of Philosophy (Ph.D.) degrees are available in the department through the Graduate School.

Lower Division Courses

F 107 Freshman Honors Seminar
1 hour winter or spring 1 ①

F 111 Introduction to Forestry
4 hours any term 3 ① 1 ③
Forest resource use alternatives; management problems and policies of forest industries and agencies; foresters' roles in increasing wood, water, recreation, and forage values; site visits to observe problems and operations. HOPKINS.

F 153 Tree Identification
3 hours fall and spring 1 ① 2 ②
Principal Pacific Coast timber trees; range, occurrence, size, growth, form; climate, soil, moisture requirements, value; wildlife uses. Not open to forestry majors. BEVER.

F 199 Special Studies
Terms and hours to be arranged

Sls 210 Soils
See SCHOOL OF AGRICULTURE.

F 220 Aerial Photointerpretation
3 hours any term 2 ① 1 ③
Principles and techniques of forest photointerpretation, mapping, and remote sensing. Prerequisite: Mth 110 or Mth 161. PAINE.

F 224 Mensuration
5 hours any term 3 ① 1 ⑥
Measurement of standing and felled timber and timber products. Prerequisite: FE 123 or FE 222; F 153 or F 154, F 220 previously or parallel. BELL, PAINE.

Wld 251
Principles of Wildlife Conservation
See SCHOOL OF AGRICULTURE.

F 254 Dendrology
4 hours fall or spring 1 ① 3 ②
Principal timber trees of the United States with special emphasis on Western species; characteristics, classification, identification. Prerequisite: Bot 201. BEVER.

F 260
Conservation of Natural Resources
3 hours winter 3 ①
Nature, extent, and importance of natural resources of United States and operation of various forest agencies in conserving them; forest, forage, recreation, wildlife, soil, and water aspects. Not open to forest management majors. HOPKINS.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

F 327 Forest Biometrics
5 hours any term 3 ① 2 ③
Application of mensurational and statistical principles and techniques in the determination of growth and yield of forest trees and stands. Prerequisite: F 224. BELL, PAINE.

F 341 Forest Ecology
5 hours fall or spring 4 ① 1 ③
Influence of environmental factors on the development, distribution, and succession of forest vegetation. Prerequisite: Sls 210; Bot 330; Bot 415; Ent 423. FERRELL.

Rng 341 Range Resources
See SCHOOL OF AGRICULTURE.

F 344 Woodland Operations
3 hours spring 2 ① 1 ③
Forest resources as related to farm and suburban environments. Operation techniques on small size farm forests and suburban woodlands. Designed for vocational agriculture education and agriculture majors. Prerequisite: junior standing. Offered alternate years. Offered 1974-75. ROBINSON.

F 364 Forest Recreation
3 hours fall or winter 2 ① 1 ③
Development of outdoor recreation in U. S.; recreation demands and resource needs; policies and practices of land management agencies; legislative proposals. DOWNING.

F 365 Forest Recreation Planning
3 hours spring 2 ① 1 ③
Inventory and evaluation of forests and other wild lands as bases for recreation policy, planning, and management decisions. Prerequisite: F 364; LA 290. DOWNING.

F 401 Research

F 403 Thesis

F 405 Reading and Conference

F 406 Projects

F 407 Seminar
Terms and hours to be arranged

F 415 Forest Administration (g)
3 hours fall or winter 3 ①
Administrative organization and managerial functions in public and private forestry agencies, problem solving. Prerequisite: senior standing. BEUTER.

Bot 415 Forest Pathology
See SCHOOL OF SCIENCE.

Ent 423 Forest Entomology
See SCHOOL OF SCIENCE.

F 427 Industrial Forestry (G)
3 hours winter 3 ①
Operation of industrial forest properties in the Northwest. Prerequisite: senior standing. SUTHERLAND.

F 432,433
Forest Management Operations (g)
5 hours fall or winter, 4 hours winter or spring 4 ① 1 ③; 3 ① 1 ③
The cycle of forest development from establishment to harvest, including operations such as reforestation, silvicultural practices, fire management, and logging methods. Prerequisite: junior standing in forestry. For forest management majors, prerequisite F 327; F 341 or Bot 341; Ent 423, ROBINSON, AULERICH, WHEELER.

F 434,435
Forest Economics and Regulation (g)
4 hours fall or winter, 4 hours winter or spring 3 ① 1 ③; 3 ① 1 ③
Valuation of forest assets including land, stumpage, capital, and equipment; economics of utilization, forest credit, taxation, marketing, and development of plans for achieving sustained-yield management. Prerequisite: senior standing in forestry; Ec 214; Mth 111 or 163. For forest engineering and forest management majors, F 432, F 433 previously or parallel. F 434 is prerequisite to F 435. SUTHERLAND, STREEBY, BEUTER.

F 436 Multiple-Use Decisions (g)
4 hours fall or spring 3 ① 1 ④
Integration of biological, economic, mathematical, and sociological characteristics of the forest system in making resource management decisions within the framework of multiple-use. Prerequisite: Rng 341; F 364,424,433,435. BEUTER.

F 442 Pine Forest Practices (G)
2 hours spring 2 ①
Silvicultural problems and treatment of pine forest types in western United States. Prerequisite: F 433; senior standing. ROBINSON.

F 460 Conflicts in Forest Conservation (g) 3 hours spring 2 ① 1 ③
Current problems and issues in wildland management with specific reference to environmental quality, recreation, multiple-use, people pressures, political aspects, and urban sprawl. Designed for nonforestry majors. Prerequisite: senior standing. HOPKINS.

F 464 Forest Recreation Management (g) 3 hours fall 3 ①
Management of public and private outdoor recreation areas. Integration of recreation with other land management objectives. Prerequisite: F 365. DOWNING.

Graduate Courses

See also courses marked (g) or (G) above.

F 501 Research

F 503 Thesis

F 505 Reading and Conference

F 506 Projects

F 507 Seminar
Terms and hours to be arranged

F 511 Economics of Private Forestry
3 hours spring 3 ①
Economic and financial problems including insurance, forest credit, cost analysis, and practical problems in forest finance. Prerequisite: F 434. Offered alternate years. Offered 1974-75. SUTHERLAND.

F 512
Economics of the Forest Resource
3 hours fall 3 ①
Economic aspects of forest resource use. Problems in allocating forest resources to the production and preservation of esthetics, fisheries, recreational opportunity, timber, water, and wildlife. Prerequisite: F 434 or equivalent. STREEBY.

F 513 Economics of Forest Utilization
3 hours winter 3 ①
Factors affecting costs and returns in forest industries. Prerequisite: F 434. Offered alternate years. Offered 1974-75. SUTHERLAND.

F 514 Forest Land Use
3 hours winter 3 ①
Economic planning applied to problem of coordinating forest land uses with one another and with other forms of land use. Prerequisite: F 435. Offered alternate years. Not offered 1974-75.

F 515 Forest Policy
3 hours winter 3 ①
Principles of forest policy formation and implementation with emphasis on contemporary policy issues. STREEBY.

F 520 Aerial Photo Mensuration
3 hours spring 1 ① 2 ③
Use of aerial photographs in forest inventory; photomensurational techniques in preparation of stand and tree volume tables; planning large scale photomensurational projects. Offered alternate years. Not offered 1974-75. PAINE.

F 521 Research Methods
3 hours fall 3 ①
Research project analyses and working plans, investigative procedures, principles and practices in scientific writing.

F 522 Economic and Social Linkages to Forest Management
3 hours fall 1 ③
Economic linkages: stages of economic growth, community dependence, inter-industry, dependence. Social linkages: society vs. nature, cultural evaluation in forest use. Prerequisite: F 435 or equivalent. BEUTER.

F 524 Forest Mensuration
3 hours winter 2 ① 1 ③
Growth determination; mensurational aspects of level of growing stock; variable plot sampling; current forest inventories. Prerequisite: F 327; St 451. BELL.

F 531 Forest Fire Management
3 hours fall 2 ① 1 ③
Preparation and execution of forest fire control plans. Environmental and ecological impacts of prescribed fire. Offered alternate years. Offered 1974-75. ROBINSON.

F 541 Environmental Physiology of Forest Trees
3 hours fall 3 ①
The physiological responses of trees to environmental factors. Processes of photosynthesis, water relations, photoperiodism, temperature reactions, and allelopathy. FERRELL.

F 542,543 Silviculture
3 hours spring, winter 2 ① 1 ③
Silvicultural practices in immature and mature stands. Forest regeneration practices. ROBINSON, WHEELER.

F 544 Forest Genetics
3 hours winter 3 ①
Plant genetics principles applied to silvicultural practices. Prerequisite: F 341 or Bot 341; Bi 341. IRGENS-MOLLER.

F 545
Pesticides in Environmental Management
3 hours spring 2 ① 1 ③
Dynamics of undisturbed forest ecosystems, responses of theoretical systems of perturbation, relation of herbicide properties to ecosystem response, optimization of response in management. Prerequisite: FC 418; Mth 211. NEWTON.

FOREST PRODUCTS

The Department of Forest Products stresses the efficient utilization of wood materials derived from the forest. The course of study combines a background in science and general education, including communications, social sciences, and humanities, with knowledge of technologies and business practices. Two options are offered to prepare individuals for diversified careers in the forest products and allied industries and in public agencies. They permit students to select areas of study according to their particular interests and abilities.

The option in wood industry management emphasizes production, sales, and technical services. The option in wood science emphasizes science and technology in wood and bark utilization, and provides a base for advanced degree work for students interested in research, product development, and academic careers.

A number of students have earned concurrent bachelor's degrees in science and in business and technology by taking additional time to complete requirements.

The Master of Science (M.S.), Master of Forestery (M.F.), and Doctor of Philosophy (Ph.D.) degrees are offered through the Graduate School.

Lower Division Course

FP 210
Wood Technology and Utilization
4 hours any term 3 ① 1 ③
Characteristics of wood related to growth, manufacturing, treatment, grading, and use of products. VAN VLIET, KRAHMER, WEST.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

FP 311 Wood Anatomy
4 hours fall 3 ① 1 ③
Minute anatomy of wood and bark, variability of wood within and among species, wood-growth quality relationships, identification of wood, and wood fibers, deterioration. Prerequisite: Bot 201; FP 210. KRAHMER, MCKIMMY.

FP 314 Physical Properties of Wood
4 hours winter 3 ① 1 ③
Hygroscopic nature of wood; wood-fluid relationships—principles and practices; electrical, thermal, and sonic properties of wood and fiber composites. Prerequisite: FP 311; Ph 202. MCKIMMY.

FP 321 Mechanical Properties I
3 hours 3 ① 1 ③
Statics and strength of materials; anisotropic properties of wood and wood-base materials; variation in properties of wood products such as functions of time, temperature, moisture content, and specific gravity; principles of determination of properties of wood products. Prerequisite: Ph 201; Mth 111 or 163. ATHERTON.

FP 370
Introduction to Wood Chemistry
4 hours fall 3 ① 1 ③
Lignin, polysaccharides, and extractives of wood and bark; distribution, isolation, structure, and relationships with anatomy, properties, and uses. Prerequisite: one year of college chemistry. WELLONS, LAVER.

FP 401 Research
FP 403 Thesis
FP 405 Reading and Conference
FP 406 Projects
FP 407 Seminar
Terms and hours to be arranged

FP 422 Mechanical Properties II (g)
4 hours fall 2 ① 2 ③
Standard tests and stress calculations; creep; strength and strength distribution; non-destructive testing; effect of density, moisture content, and temperature on strength; codes; standards; trade associations; design aids. Prerequisite: FP 321. ATHERTON.

FP 441 Mechanical Conversion I (g)
4 hours spring 3 ① 1 ③
Wood breakdown and surface generation; processes; product quality; manufacturing plants; equipment selection, layout; production practices. Prerequisite: FP 210; junior standing. WEST.

FP 442 Mechanical Conversion II (g)
4 hours fall 3 ① 1 ③
Adhesion principles and coating techniques; properties, quality, and uses of veneer, plywood, laminated products, hardboards, and particleboard; plant layout and design. Prerequisite: FP 210; senior standing. WELLONS, VAN VLIET, MCKIMMY.

FP 443 Pulp and Paper Processes (g)
4 hours winter 3 ① 1 ③
Chemistry and technology of fundamental processes of the pulp and paper industry including pulping, bleaching, refining, sheet forming, filling, sizing, coloring, and coating. Paper testing and relationship of fiber properties; wet process fiberboard. Prerequisite: FP 370 or equivalent. BUBLITZ.

FP 452 Wood Industry Problems (g)
3 hours spring 2 ① 1 ③
Manufacturing problems in wood-using industries; raw material, types of products, production problems, cost analysis, residue utilization, and administration; plant visits. Prerequisite: FP 210; senior standing. WEST.

FP 453
Forest Products Merchandising (g)
4 hours winter 3 ① 1 ③
Trade practices and customs pertaining to distribution of forest products, wholesale and retail; architect interaction; case studies in forest products merchandising. Prerequisite: FP 210; senior standing. WEST.

Graduate Courses

See also courses marked (g) or (G) above.

FP 501 Research
FP 503 Thesis
FP 505 Reading and Conference
FP 506 Projects
Terms and hours to be arranged

FP 507 Seminar
Terms and hours to be arranged
Subject matter as required by graduate program. RESCH.

FP 510 Wood Microtechnique
3 hours 3 ③
Preparation, sectioning or maceration, staining, and mounting of slides of wood and wood-base materials for microscopic study, photomicrography. Prerequisite: FP 311. KRAHMER.

FP 512 Wood Anatomy
4 hours 3 ① 1 ③
Development, structure, and function of cells and tissues in woody plants; cell types and distribution; interpretation of electron microscopy and other techniques used in the study of fine structure of wood. Prerequisite: FP 311. KRAHMER.

FP 513
Wood Growth-Quality Relationships
3 hours winter 3 ①
Recent advances in relationship of conditions of growth with wood and fiber structure and properties, cell differentiation and development, and ultra-structure of plant cell walls. Prerequisite: FP 512. Offered alternate years. Offered 1973-74. MCKIMMY.

FP 514 Advanced Wood Physics
4 hours 3 ① 1 ③
Wood and fiber composites in terms of anisotropic elasticity; rheology; fracture; mass, heat, and charge transport; dielectric theories; thermodynamics; wood-fluid interaction; fiber optics; research techniques. Prerequisite: Mth 211; Ph 203; FP 314.

FP 515
Selected Topics in Wood Physics
3 hours spring 3 ①
Advanced course in wood physics and its application to special fields of study, according to student needs. Topics will include: (1) Advanced timber mechanics, (2) Surface properties of wood and composites, (3) Theories of dielectrics, (4) Thermodynamics of wood and cellulose, (5) Mass, heat, and charge transport, (6) Wood-fluid relationships. Prerequisite: FP 514. Offered alternate years. Offered 1974-75. POLENSEK.

FP 516 Wood Chemistry
4 hours winter 3 ① 1 ③
Chemistry of wood polysaccharides, lignin, polyphenolics, and other extractives; present and potential utilization; analytical procedures specific to chemical constituents of wood and bark. Prerequisite: one year of organic chemistry; physical chemistry previously or parallel. LAVER, WELLONS.

FP 531 Wood Industry Management
3 hours winter 3 ①
Application of communication theory, operations research, and modern management techniques to the unique problems and situations encountered in the forest products industry. The structure, analysis, and operation of wood using firms. Prerequisite: FP 210; BA 203; or IE 272. Offered alternate years. Offered 1973-74. VAN VLIET.

FP 540 Wood Technology
3 hours spring 3 ①
Technological aspects of wood-fluid relationships involved in wood seasoning and preservation; applications and ramifications of recent developments in these areas; application of principles of adhesion and coating practices related to wood. Prerequisite: FP 314,370,442. Offered alternate years. Offered 1974-75.

FP 570
Selected Topics in Wood Chemistry
3 hours 3 ①
Recent advances in wood chemistry including biogenesis of cell wall and extractive components, advanced carbohydrate chemistry, "aging" in wood, heartwood formation, chemistry of flavonoids, tannins, wood resins, and terpenes. Prerequisite: FP 516. LAVER, WELLONS.

FP 580
Advanced Pulp and Paper Technology
4 hours spring 3 ① 1 ③
Topics include unit process in pulp and paper; high polymer technology in pulp and paper; optical behavior of paper, colloidal properties of fibers and additives; paper machinery variables; paper specialties; printing and conversion; air and water pollution problems. Prerequisite: FP 443. BUBLITZ.

Resource Recreation Management

This program deals with man's efforts to develop and enjoy his recreative use of the environment (land, forests, water, and other natural resources). It includes the study of man/man relationships and man/environment relationships in a recreational setting, and how these relationships influence the management and use of recreational resources.

The curriculum includes basic courses in humanities, arts, social science, science, and professional courses. Three options are offered:

Outdoor Recreation emphasizes facility development, comprehensive site planning, and man-resource relationships. Graduates may find employment in federal, state, and regional agencies such as: the Corps of Engineers, the Soil Conservation Service, the Bureau of Outdoor Recreation, the Extension Service, state and county parks, and privately owned enterprises.

Environmental Interpretation prepares people to be competent in helping others develop awareness, sensitivity, and understanding of man's impact on the natural world. Graduates pursue professions as park naturalists, directors of interpretive or environmental studies programs in national, state, or regional natural resource agencies.

Park Administration prepares persons for careers in park planning, development, maintenance, and administration. Graduates may find employment in private enterprise and federal, state, county, and urban park systems.

Through the Graduate School, the department offers a graduate minor.

Lower Division Courses

RR 121 Man and Leisure
3 hours 3 ①
Service course dealing with the expanding role of leisure in contemporary American life; contemporary factors influencing leisure: leisure values as related to individual and society. HEATH, JACKSON.

RR 171
Foundations of Recreation and Leisure
5 hours 5 ①
Professional course dealing with the background, present status, future goals, and challenges of leisure and the leisure service professions. HEATH, REED.

RR 221 Wilderness and Leisure
3 hours 3 ①
Historical analysis of American wilderness; wilderness history, preservation, camping, overuse, ecology, geographic areas, and wilderness as a leisure experience.

RR 222 Concepts of Survival
3 hours 3 ①
Multiple aspects; state of mind, physical limitations, biological needs. FREED.

RR 261 Leisure and Ecology
3 hours 3 ①
Interrelationships of man's leisure pursuits and the environment. Prerequisite: RR 171. FREED.

RR 263 Camp Leadership
3 hours 3 ①
Counselor training, responsibility in camp, camper problems, camp relationships. Three-day field trip. MILLIKEN, SLEZAK.

RR 281
Park and Recreation Area Analysis
Application of evaluative criteria to major areas and facilities comprising the recreation resource base. Prerequisite: RR 171; LA 291. REED.

Upper Division Courses

RR 321
Socio-Psychological Concepts of Leisure
4 hours 4 ①
Sociological implications of leisure, contemporary psychological dimensions, issues, and significant relationships. Prerequisite: RR 121 and two terms of behavioral science. JACKSON.

RR 351,352
Supervised Field Experience
2 hours each term 2 ①
Supervised laboratory experience in the leisure services professions. Prerequisite: RR 321.

RR 371 State and Federal Recreation
3 hours 3 ①
Recreational use of public domain; its historical, current, and potential use as a leisure resource. Prerequisite: RR 171; PS 203. HEATH.

RR 381
Park Systems Planning and Development
3 hours 3 ①
Design principles and concepts applied to systematic planning and development of park and recreation facilities. Prerequisite: RR 281. REED.

RR 391
Leisure and Environmental Values
3 hours 3 ①
Historical relationships of man's leisure activities and attitudes toward the environment with emphasis on development of attitudes and concepts relating to ecologically sound practices. Prerequisite: two terms of biological science. FREED.

RR 405 Reading and Conference (g)
RR 407 Seminar (g)
RR 408 Workshop (g)
Terms and hours to be arranged

RR 412 Internship
12 hours
Full-time supervised professional experience emphasizing functional proficiency under joint sponsorship of university and agency personnel. Prerequisite: RR 352.

RR 421 Philosophical and Historical Basis of Leisure (g)
4 hours 4 ①
Philosophical and historical implications of leisure; changing concepts of time, work, education, and leisure, and their impact on American values, culture, and life style. Prerequisite: RR 321. JACKSON.

RR 473 Outdoor Recreation Policy (g)
3 hours 3 ①
Policy formation and analysis of recreation resources in federal and state land management agencies. Prerequisite: RR 371. REED.

RR 475
Outdoor Recreation Development (g)
3 hours 3 ①
Analysis of recreation resources, agencies, and organizations, concepts of management, policies and problems, feasibility for development, planning and design considerations, and value determination. Prerequisite: two years of natural science; two years of social science; RR 473.

RR 483 Park Operations (g)
3 hours 3 ①
Management operations for park lands and water resources: turf, soil, tree and shrub, and water management processes and procedures; litter, vandalism, law enforcement, and park visitor problems. Prerequisite: RR 381.

RR 485 Park Management (g)
3 hours 3 ①
Management principles, practices, and problems of parks and outdoor recreation areas and systems. Prerequisite: RR 483; PS 412; BA 361. REED.

RR 493 Environmental Interpretation
(g) 3 hours 3 ①
Interpretation of natural, archeological, and historical features in parks, museums, and similar settings. Prerequisite: two years of natural science; two years of social science; RR 391. FREED.

RR 496 Interpretive Methods and Site Development (g)
3 hours 3 ①
Contemporary methods and techniques used in interpretive situations; design, development, and management of an interpretive operation within the framework of land limitations and human needs. Prerequisite: Four terms of biological science; RR 493. FREED.

[1] Graduate credit for RR 405,407, and 408 combined may not exceed 9 hours.

HEALTH AND PHYSICAL EDUCATION

FACULTY

As of January 1974

JAMES W. LONG, Ph.D., Director of Division of Health and Physical Education; Professor of Physical Education.

ROBERT W. BERGSTROM, Ed.D., Assistant Director and Head Adviser; Professor.

ARNOLD W. FLATH, Ph.D., Assistant Director; Professor.

PROFESSORS EMERITUS Adrion, Allman, C. L. Anderson, Coleman, Seen
ASSOCIATE PROFESSORS EMERITUS Cox, Flood, Hupprich, McKalip, Thompson
ASSISTANT PROFESSORS EMERITUS Gawer, McAllester
SENIOR INSTRUCTOR H. Poling

Physical Education: PROFESSORS Lambert (department head), Andros, Bergstrom, Campbell, Dailey, Flath, Long, Miller, Thomas, Weir
ASSOCIATE PROFESSORS Albin, Dixon, Drlica, Masilionis, Martinson, Megale, Moe, O'Shea, D. Poling, Tanselli, Torpey, Wagner, Winkler
ASSISTANT PROFESSORS Brock, Brust, Cramer, Dickinson Hancock, K. Heath, Ingram, Irvin, Martin, McNeil, Michael, Moore, Pye, Riley, Robertson, Schaefer, Shearer, Suttie, Tillman, Wyckoff
INSTRUCTORS Guggenheim, Irwin, Leete

Health: PROFESSORS Koski (department head), G. W. Anderson, Foster
ASSOCIATE PROFESSORS Copeland, Ellis, Erickson, Krakauer, Lawson, Phelps, Terhune, Younger
ASSISTANT PROFESSORS Gibson, Houston, Krone
INSTRUCTORS Heyden, Parker

THE DIVISION OF HEALTH AND PHYSICAL EDUCATION is responsible for: (1) professional study programs leading to baccalaureate degrees in health and in physical education; (2) basic instruction in health and physical education for all OSU students; (3) professional service courses in health, and in physical education for students in other schools; (4) basic four-year and standard five-year teacher education programs leading to certification in health, physical education, and health and physical education; (5) professional courses in health and in physical education which may be included in graduate programs; and (6) extramural sports for women and intramural sports and recreational activity programs for all students and staff members.

Basic Instruction

Basic instruction in health and in physical education is offered for all students. Personal health courses are designed to give each student the necessary educational foundation to promote his own health and that of his dependents and to make health decisions in behalf of himself, his family, and his community. Basic physical education instruction is designed to assist each student to develop skills for leisure time and to make intelligent decisions concerning the physical activity needs and programs for himself and his community.

The university graduation requirements for all students include one term of personal health and three terms of physical education performance courses which are expected to be completed during the first six terms on campus. For complete information on health and physical education requirements see pages 152-155.

Based on the medical examination required of all entering students, the Student Health Center advises the Division of Health and Physical Education in the assignment of students to activities in accord with their physical needs. Students are classified for (1) unlimited activity, (2) unlimited activity with observation, (3) restricted activity, (4) adaptives, or (5) no activity.

An interdisciplinary program in Residential Institution Management, in which the Division of Health and Physical Education participates, is described on page 83.

Physical Education Requirements

Courses which satisfy the physical education requirement for graduation are designated as MPE, WPE, and CPE 100 to 199. Professional activity courses (PE 194, 294, 394, 494) taken by students enrolled in area of emphasis, minor, or area of concentration programs in physical education satisfy university physical education requirements. For students who have completed university requirements, a total of eight term hours of performance courses may be elected above the regular requirement.

Personal Health Requirements

Courses H 160 or H 170 satisfy the personal health requirement for women or for men. Students are expected to complete the health requirement during the freshman year. Personal health and physical education activity courses usually are taken in different terms, but it is permissible for these courses to be taken concurrently.

Fees

Regular registration fees entitle every student to use of gymnasium, pool, showers, gymnasium suits, swimming suits, towels, and laundry service. Every student may have a basket or locker in the gymnasium for his or her exclusive use and is urged to use gymnasium facilities to the utmost.

Extramural Sports

The Office of Intramural-Extramural Sports and Recreational Activities organizes and administers an extramural program for women students consisting of various team and individual sports.

Intramural and Recreational Activities

A comprehensive intramural sports program offers sports for all students. Living organizations, clubs, individuals, classes, and departments compete with friendly rivalry in many sports. This program is separate from intercollegiate athletics. Recreational activities in swimming, volleyball, fitness programs, and other activities are available to both students and staff members.

Professional Service Courses

Many opportunities exist for combining courses in health and in physical education with courses in science, agriculture, business and technology, education, engineering, forestry, and home economics. Students majoring in other teaching fields or other schools or colleges may elect work in physical education or in health, by completing professional courses in these fields. Certification in both elementary education and physical education or an area of concentration in either health education or physical education may be elected by elementary teacher candidates. Qualified students in other teaching fields may complete a professional minor program to prepare for athletic coaching or athletic administration assignments. For information concerning professional courses and programs, consult advisers in the Division.

Teacher Education

Students desiring to become teachers of health education or physical education in schools must be admitted to the teacher education program. Formal application for admission to the teacher credential program is made following completion of 75 term hours of academic work. Permission to take professional courses leading to a credential is based on academic, professional, personal, and social qualifications. Consult with advisers in the Division for further information and application forms.

Curricula and Courses

HEALTH

The Department of Health offers professional study programs leading to baccalaureate and advanced degrees for nonmedical professional personnel seeking health careers. Health is a collective, applied body of knowledge based on the life sciences and social sciences concerned with the effect of man's activities and the environment on his personal and community well-being. The Department promotes research and expansion of knowledge in the areas of personal, community, and environmental health and in disease control, aging, safety, and other fields of specialization.

Undergraduate Programs

The health curriculum meets university requirements for the Bachelor of Science degree and includes basic science, social science, and humanities courses which are fundamental to preparation for professional health careers. In addition to general education and specific health courses, each undergraduate student will complete an area of emphasis selected from (1) school health education; option A school health or option B school health and safety, or (2) community health, or (3) environmental health. The basic program outlined below will be required of all baccalaureate degree candidates.

Basic Program

	Hours
Personal Health (H 170)	3
Man, Health, and Environment (H 331)	3
Commun and Noncomm Diseases (H 332)	3
Community Health (H 334)	3
Approved Physical Science	9–13
Approved Biological Science	6–12
English Composition (Wr 121)	3
Fundamentals of Speech (Sp 111)	3
Outlines of Economics (Ec 115)	4
General Psychology (Psy 200)	5
American National Government (PS 201)	5
General Sociology (Soc 204,205)	6
Physical education	3
Basic Program	56–66
Area of Emphasis	29–53
Supporting courses for area of emphasis	22–66
Electives	27–38

Areas of Emphasis

Depending on his specific professional goal, the student will select one area of emphasis to prepare him for professional health careers in that area. Substitutions or changes in the courses listed in each area of emphasis require approval of the faculty adviser, the department, and the division director. Many health courses are available as electives for students with individual health interests.

SCHOOL HEALTH EDUCATION

Students seeking careers as health teachers in schools will select one of the school health education options. These programs meet the requirements of Oregon teacher certification grades K-12. Two options are offered: Option A, School Health, will prepare the student for instruction of health; Option B, School Health and Safety, will prepare the student for instruction in safety, including traffic safety, as well as for health instruction. Opportunities are provided to combine grades 5-12 certification in health with certification in other teaching fields such as physical education, social science, biology, and home economics education. Application for formal admission to the teacher education program must be made after completion of 75 hours of academic work. Selection will be based on both professional and personal qualifications of the candidate. Courses required in addition to the basic program are:

Option A School Health	Hours
Health Professions and Programs (H 123)	3
Consumer Health (H 222)	3
School Health Education (H 321)	3
Drug Problems in Public Educ (H 326)	3
First Aid and Emergency Care (H 358)	3
Safety Education (H 360)	3
Seminar: Adv Emergency Care (H 407)	2
Seminar: Mental Health (H 407)	3
Sex Education (H 444)	3
*Health of the School Age Child (H 451)	3
	29

Option B School Health and Safety	
Option A School Health required courses	29
Principles of Accident Prevention (H 359)	3
Driver and Traffic Safety Educ (H 480)	3
Programs in Traffic Safety Educ (H 481)	3
Problems in Safety (H 485)	3
Safety Program Management (H 486)	3
	44

Supporting Courses	
General Anthropology (Anth 106)	3
Introduction to Microbiology (Mb 130)	3
Approved communication course	3
Nutrition (FN 225)	4
Elementary Human Anatomy (Z 321)	3
Physiology (Z 331,332)	6
	22

Education courses for certification	39
Option A: school health	90
Option B: school health and safety	105

* Not required for students who teach in grades 9-12 only.

COMMUNITY HEALTH

Students seeking professional positions with official and voluntary health agencies or health-allied fields will select the area of emphasis in community health. This area emphasizes courses in the behavioral, biological, and health sciences; communications; and public administration. Graduates are prepared to

accept employment with federal, state, and local health organizations. Courses required in addition to the basic program are:

	Hours
Health Courses	
Consumer Health (H 222)	3
School Health Education (H 321)	3
Drug Problems in Public Educ (H 326)	3
Commun Health Educ Proc (H 333)	3
Principles of Accident Prevention (H 359)	3
Health Agencies and Programs (H 426)	3
Epidemiology (H 453)	3
Community Health Education (H 471)	3
Field Experience (H 475)	12–15
Evaluation (H 491)	3
Supporting Courses	
Journalism (J 111,112)	6
Introduction to Microbiology (Mb 130)	3
Intro to Bus Data Processing (BA 131)	3
Nutrition (FN 225)	4
Introduction to Statistics (St 311)	3
Public Information Methods (J 318)	3
Technical Reporting (J 319)	3
Elementary Human Anatomy (Z 321)	3
Human Physiology (Z 331,332)	6
Social Organization (Soc 361)	3
Public Administration (PS 411,412)	6
Prob and Issues in Public Admin (PS 413)	3
Preparation of Audio-Visual Aids (Ed 436)	3
Medical Sociology (Soc 459)	3
Community Organization (Soc 475)	3
	94–97

ENVIRONMENTAL HEALTH

Students seeking professional positions in the control of environmental health problems will select the environmental health area of emphasis. Graduates will be prepared to accept employment as sanitarians, food inspectors, water and air pollution specialists, and in other positions related to environmental health control. This area prepares science-oriented graduates in matters of control of the environment affecting personal and community health. This area of emphasis is available for health students at OSU because of the unique scientific and technological characteristics of the state's land grant university. Courses required in addition to the basic program are:

	Hours
Health Courses	
Principles of Accident Prevention (H 359)	3
Health Agencies and Programs (H 426)	3
Environmental Health (H 431)	3
Institutional Hygiene (H 443)	3
Epidemiology (H 453)	3
Field Experience (H 475)	9–12
Evaluation (H 491)	3
Vectors and Solid Waste (H 491)	3
Supporting Courses	
General Biology (GS 101,102,103)	12
Mathematics (Mth 111)	4
General Physics (Ph 201,202)	9
Soils (Sls 210)	5
Nutrition (FN 225)	4
Organic Chemistry (Ch 226,227)	6
Introduction to the Atmosphere (AtS 300)	3
General Microbiology (Mb 304,305)	9
Applied Entomology (Ent 311)	3
Seminar: Govt and the Environ (PS 407)	3
Microbl Contamination Control (Mb 440)	3
Food Microbiology (Mb 444)	3
Biology of Radiation (GS 450)	2
	96–99

Graduate Programs

The Department offers major graduate study in health leading to the M.A., M.S., and Ed.M. degrees conferred through the School of Education. Graduate courses in health may be combined with graduate courses in education to satisfy major course requirements for the Ph.D. or Ed.D. degree conferred through the School of Education.

Health Courses

Lower Division Service Courses

H 160 Personal Health
2 hours any term. 2 ①
Health principles and practice in the promotion of personal and community health directed toward improvement in the quality of health, the extension of the prime of life and an increase in life expectancy.

H 170 Personal Health
3 hours. 3 ①
Health principles and practice in the promotion of personal and community health directed toward improvement in the quality of health, the extension of the prime of life and an increase in life expectancy. Specially directed to students having a need for a more extensive and intensive study of the subject.

Lower Division Professional Courses

H 123. Health Professions and Programs.
3 hours. 3 ①
Background and philosophy; statistical facts that indicate need; modern practices; organizations; opportunities for professional work in field.

H 199. Special Studies.
Terms and hours to be arranged.

H 222. Consumer Health.
3 hours. 3 ①
Health aspects of consumer protection; decision-making regarding health products and services; superstitions and misconceptions, advertising, quackery, selection of medical and dental services, health insurance. Prerequisite: H 160 or 170.

Upper Division Professional Courses

Courses numbered 400-499 and designated (G) may be taken for graduate credit.

H 321. School Health Education.
3 hours. 3 ①
Developing ability of public school student to understand and guide his own health and to contribute to health of community. Prerequisite: H 160 or 170; one year of biological science.

H 326. Drug Problems in Public Education.
3 hours. 3 ①
Drug abuse problems and their implications for educators; school policies; community resources; counseling programs; prevention of drug abuse. Emphasis on teacher preparation.

H 331. Man, Health, and Environment.
3 hours. 3 ①
Environmental hazards affecting man's health with particular reference to air, land, water, food, residential living and vector control. Prerequisite: H 160 or 170; one term of microbiology; one year of biological science.

H 332. Communicable and Noncommunicable Diseases.
3 hours. 3 ①
Modern concepts of diseases; prevention and control of disease, characteristics of common communicable diseases; chronic disease problem, specific chronic diseases, and programs of prevention and control. Prerequisite: H 160 or 170; one term of microbiology; one year of biological science.

H 333. Community Health Education Processes.
3 hours. 3 ①
Nature of communication in health education; emphasis on group structure, leadership, and mass media. Prerequisite: Psy 200; J 318; Soc 361.

H 334. Community Health.
3 hours. 3 ①
Principles of community health practice; analysis of local, state, and national problems; official and voluntary health programs and services; comprehensive health planning and program evaluation. Prerequisite: H 331, 332.

H 358. First Aid and Emergency Care.
3 hours. 2 ① 1 ②
Emergency treatment for various types of injuries; control of bleeding, artificial respiration, transportation, splinting, and bandaging. Course leads to Red Cross Standard and Advanced certification. Open as a service course to all departments.

H 359. Principles of Accident Prevention.
3 hours. 3 ①
Principles, concepts, and methodology of accident prevention programs; analyses of accident causation factors. General service course providing safety background for proper safety practices. Prerequisite: H 358 or equivalent.

H 360. Safety Education.
3 hours. 3 ①
All phases of safety; home, fire, industrial, water, rural, school, and traffic safety; elementary, secondary, and adult.

H 401. Research. (G)

H 403. Thesis. (G)

H 405. Reading and Conference. (G)

H 406. Projects. (G)

H 407. Seminar. (G)

H 408. Workshop. (G)
Terms and hours to be arranged.

H 426. Health Agencies and Programs. (G) 3 hours. 3 ①
Air pollution programs; noise abatement; general environment controls; community health agencies; state official health agencies; voluntary health agencies; national and international health organizations. Prerequisite: H 334; senior standing.

H 431. Environmental Health. (G)
3 hours. 3 ①
Environmental factors affecting public health; application of principles of sanitation and health science to solution of environmental problems. Prerequisite: H 331,332; senior standing.

H 432. Control of Chronic Disease. (G) 3 hours. 3 ①
Nature of chronic diseases and application of established control measures. Prerequisite: H 331,332; senior standing.

H 433. Health Aspects of Gerontology. (G) 3 hours. 3 ①
Promotion of normal health in the aged; procedures for dealing with deviations most likely to occur; personal, home, and community resources available to the senior citizen. Prerequisite: H 331,332; senior standing.

H 441. School Health Programs. (G)
3 hours. 3 ①
Responsibility of teachers for participating in the school's health service program, cooperation with community agencies. Organization of health instruction, curriculum, needs and interest of children. Prerequisite: H 321; senior standing.

H 443. Institutional Hygiene. (G)
3 hours. 2 ① 1 ②
In-depth study of several environmental health problems existing in today's institutions. Community involvement with the local institutions will be emphasized (i.e., university, schools, hospitals, prisons, etc.). Prerequisite: H 331; senior standing.

H 444. Sex Education. (G)
3 hours. 3 ①
Aspects of sex and reproduction fundamental to sex education; relation of the school to other community institutions. Development of teaching units for public school programs with emphasis on the normal. Prerequisite: H 321; senior standing.

H 451. Health of the School-Age Child. (G)
3 hours. 3 ①
Special health problems and the school's opportunities and responsibilities. Prerequisite: H 321,332; senior standing.

H 453. Epidemiology. (G)
3 hours spring. 3 ①
Basic principles underlying the study and control of communicable and organic diseases in the general population. Prerequisite: H 332; senior standing.

H 461. School Health Administration. (G) 3 hours. 3 ①
Types of administrative control; budgetary problems; school health-public health integration; responsibilities of school health personnel. The case study method and incident process. Studies of actual school health programs. Prerequisite: H 321,441.

H 471. Community Health Education. (G) 3 hours. 3 ①
Nature, principles, and procedures of community health action in terms of the needs of people in the health and parahealth fields. Prerequisite: H 333,334; senior standing.

H 475. Field Experience. (G)
9 to 15 hours.
Directed field experience with participating official and voluntary health agencies individually arranged to meet student needs. Limited to health majors. Prerequisite: senior standing. Consent of instructor required.

H 480. Driver and Traffic Safety Education. (G)
3 hours. 2 ① 1 ②
Driver and traffic safety instructional systems for high schools; need assessment, task analysis, dual-control car procedures, systems development. Prerequisite: H 359,360; senior standing.

H 481. Programs in Traffic Safety Education. (G)
3 hours. 2 ① 1 ②
Advanced driver and traffic safety programs; simulation models, multi-media systems, range programs, evaluative practices, and interrelationships of laboratory instruction. Prerequisite: H 480.

H 485. Problems in Safety. (G)
3 hours. 3 ①
Problems in safety and safety education; current research and countermeasures. Prerequisite: H 358,359,360; senior standing.

H 486. Safety Program Management. (G) 3 hours. 3 ①
Administrating and supervising safety education, safety services, and environmental safety; integration of school and community safety programs. Prerequisite: H 358,359, 360; senior standing.

H 491. Selected Topics. (G)
3 hours. 3 ①
Course acquaints student with recent changes and advances in health and their application to special fields of study. Topics covered vary from term to term and from year to year. Prerequisite: senior standing.

PHYSICAL EDUCATION

The Department of Physical Education offers undergraduate study programs leading to baccalaureate degrees for students seeking physical education careers in teaching or in related applied fields. Physical education is an applied body of knowledge based on the sciences, social sciences, and humanities concerned with the effects of human physical performance on man and society. The department promotes research and expansion of knowledge in the areas of exercise physiology, performance mechanics, therapeutic programs, athletic training, sports psychology, sport sociology, aesthetics of human performance, psychomotor learning, and other fields of specialization.

Undergraduate Program

The basic physical education curriculum meets university requirements for the bachelor's degree and provides general education in the sciences, social sciences, and humanities needed for professional preparation. In addition to the general education and professional courses listed in the basic program, undergraduate major students will complete an area of emphasis selected from (1) School Physical Education, (2) Pretherapy, (3) Athletic Training, (4) Athletic Administration, or (5) Applied Physical Education. The basic program outlined below will be required of all baccalaureate degree candidates.

Lower Division

	Hours
Biological science sequence	9
Social science sequence	9
Science or social science sequence	9
Humanities sequence	9
English Composition (Wr 121)	3
Speech	3
General Psychology (Psy 200)	5
Professional Activities (PE 194)	6
Philosophical Basis of Human Movement (PE 211)	3
Human Movement Aesthetics (PE 212)	3
Personal Health (H 160 or H 170)	2–3
Area of emphasis or electives	34–35

Upper Division

	Hours
Elementary Human Anatomy (Z 321,322)	6
Physiology (Z 331,332)	6
Psychological Basis of Human Movement (PE 311)	3
Sociological Basis of Human Movement (PE 312)	3
Kinesiology (PE 323)	3
Physiology of Exercise (PE 433)	3
Area of emphasis or electives	72

Areas of Emphasis

Depending upon his professional goal, each major student will select one area of emphasis appropriate for preparation in that area. Substitutions or changes in the courses listed in each area of emphasis require approval of the faculty adviser, the department head, and the division director.

SCHOOL PHYSICAL EDUCATION

Students seeking to become physical education teachers from kindergarten through grade 12 in schools will select the school physical education area of emphasis. The program includes those courses required for Oregon teacher certification. Students may combine certification in physical education with certification in other teaching fields such as health, science, or elementary education. Consult with departmental advisers concerning requirements for dual certification programs. Application for formal admission to the teacher education program must be made after completion of 75 hours of academic work. Selection will be based on both professional and personal qualifications of the candidate. Courses required are:

	Hours
Care and Prev of Athl Injuries (PE 259)	2
Professional Activities (PE 294,394,494)	14
Motor Development (PE 313)	3
Elem School Phys Ed (PE 320)	3
Phys Ed Practicum (PE 333,334,335)	6
Athletic Coaching course	2
School Programs (PE 441)	4
Evaluation of Phys Ed (PE 443)	3
Adapted Physical Education (PE 444)	3
Education courses for certification	33–36
	73–76

PRETHERAPY

Students who seek careers in physical, occupational, or corrective therapy will select the pretherapy area of emphasis. Admission to a therapy school for further education and licensing may be sought after completion of the second, third, or fourth year of the program. Courses required are:

Physical Education Courses	*Hours*
Pretherapy (PE 132)	2
Phys Ed Practicum (PE 333,334)	4
Adapted Physical Education (PE 444)	3
Therapeutic Physical Education (PE 454)	3
Perceptual Motor Skill Training (PE 456)	3
Supporting Courses	
Seminar: Mental Health (H 407)	3
General Chemistry sequence	13
General Physics (Ph 201,202,203)	12
Genetics (Bi 341)	3
Genetics Laboratory (Bi 342)	2
Human Heredity and Evolution (Z 141)	3
General Sociology (Soc 204,205,206)	9
Human Development (Psy 311)	3
Human Adjustment (Psy 314)	3
Exper Psychology (Psy 321,322,323)	9
Neuroanatomy of Human Behav (Psy 350)	3
Perception (Psy 415)	3
Physiological Psychology (Psy 451)	3
Physiological Psychology Lab (Psy 452)	2
Behavior Deviation (Psy 462)	3
Introduction to Statistics (St 311)	3
	92

ATHLETIC TRAINING

Students who seek careers as athletic trainers will select the athletic training area of emphasis. Athletic training is an auxiliary service provided under medical direction to athletic teams and is concerned with the prevention, treat-

ment, and rehabilitation of athletic injuries. The athletic training program provides a curriculum necessary for accreditation by the National Athletic Training Association. Students who seek athletic training assignments in schools must obtain a teaching certificate in a subject field prior to employment.

	Hours
Care and Prev of Ath Injuries (PE 259)	2
Ath Training Intern (PE 357,358,359)	9
School Programs (PE 441)	4
Athletic Training Programs (PE 459)	3
Therapeutic Phys Ed (PE 454)	3
First Aid and Emergency Care (H 358)	3
Nutrition (FN 225)	4
Football Coaching (PE 365)	2
Basketball Coaching (PE 366)	2
Track and Field Coaching (PE 368)	2
General Chemistry sequence	13
General Physics (Ph 201,202,203)	12
Approved psychology courses	11
	70

ATHLETIC ADMINISTRATION

Students who seek careers in the administration of sports and athletic programs will select the athletic administration area of emphasis. The program follows the *Guidelines for Professional Preparation of Athletic Administrators* developed by the NCAA, NCPEAM and AAHPER. In addition to the courses listed in the basic program, the following courses are required:

	Hours
Care and Prevention of Athletic Injuries (PE 259)	2
Physical Education Practicum (PE 333)	2
Projects: Athletic Administration (PE 406)	2
Admin of Physical Education (PE 448)	3
Current Trends and Problems (PE 449)	3
Competitive Athletics (PE 451)	3
Facilities (PE 455)	3
Athletic Training Programs (PE 459)	3
Basic Account and Fin Analysis (BA 217)	3
Business Law (BA 315)	3
Behavior in Organization (BA 361)	4
Personnel Management (BA 467)	3
The Teacher and the Law (Ed 476)	3
First Aid and Emergency Care (H 358)	3
Journalism (J 111)	3
Public Information Methods (J 318)	3
Introduction to Persuasion (Sp 113)	3
	49

APPLIED PHYSICAL EDUCATION

Qualified students who seek other professional careers may complete an area of emphasis of not less than 36 term hours of approved courses unified by the requirements of the professional goal. Such programs will require the approval of the adviser, the department head, the curriculum committee of the division, and the division director. Qualified students may arrange a program with greater concentration in business, communications, statistics, physiology, chemistry, or the arts where the courses are unified by the requirements of professional positions such as in dance, sports communications, or scientific research in human performance.

Minors

Undergraduate minors in (a) athletic coaching or (b) athletic administration are offered for students who complete undergraduate major programs in other colleges, schools, or departments.

Athletic Coaching

The minor in athletic coaching provides professional preparation for teachers and others who seek athletic coaching assignments with schools, recreation programs, or private and community agencies. Upon request, the Department of Physical Education will provide written verification of successful completion of the program. Required courses in the athletic coaching minor are:

	Hours
Professional Activ (PE 194,294,394,494)	4
Care and Preven of Athl Injur (PE 259)	2
Motor Development (PE 313)	3
Kinesiology (PE 323)	3
Physical Education Practicum (PE 333)	2
Athletic Coaching Courses (PE 362-369)	4
Seminar: Psy of Coaching (PE 407)	3
Seminar: Sports in Amer Culture (PE 407)	3
Physiology of Exercise (PE 433)	3
Competitive Athletics (PE 451)	3
Elementary Human Anatomy (Z 321,322)	6
Physiology (Z 331,332)	6
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Athletic Administration

The athletic administration minor provides professional preparation for students who seek sport and athletic administrative positions while completing an undergraduate major in other schools such as education, business and technology, journalism, or other field. The expansion in participation, investment, and involvement by all society in the success of athletic programs requires increased competence from program administrators. Required courses in the athletic administration minor are:

	Hours
Phil Basis of Hum Movement (PE 211)	3
Physical Educ Practicum (PE 333,334)	4
Projects: Athletic Administration (PE 406)	2
Seminar: Sport in the American Culture (PE 407)	3
Administration of Physical Educ (PE 448)	3
Current Trends and Problems (PE 449)	3
Competitive Athletics (PE 451)	3
Facilities (PE 455)	3
Athletic Training Programs (PE 459)	3
Basic Accounting and Fin Anal (BA 217)	3
Behavior in Organizations (BA 361)	4
Journalism (J 111)	3
Interpersonal Speech Comm (Sp 111)	3
	40

Graduate Program

Candidates for the Master of Education or Master of Science degree offered through the School of Education may complete a graduate minor in physical education. Doctoral degree candidates may complete a minor in physical education by completing physical education graduate courses as approved by the candidate's doctoral committee and the Graduate Council.

Physical Education Courses

MPE 100-199. **Physical Education (Men).**
1 hour. 3 ①

WPE 100-199. **Physical Education (Women).**
1 hour. 3 ①

CPE 100-199. **Physical Education (Coeducational).**
1 hour. 3 ①
Variety of required or elective activity courses taught for educational and recreational values. Fulfills university requirement and covers following activity fields.

ADAPTIVES: Posture, relaxation, restrictive, weight control.

AQUATICS: Aquatic arts, canoeing, crew, scuba, swimming, life saving, water safety instruction.

COMBATIVES: Judo, self-defense, wrestling.

CONDITIONING: Fitness appreciation, gymnastic conditioning, rhythmic conditioning, ski conditioning, weight training.

INDIVIDUAL SPORTS: Archery, badminton, billiards, bowling, cycling, fencing, golf, gymnastics, riding, skiing, tennis, track and field, tumbling.

TEAM SPORTS: Basketball, hockey, outdoor sports, rugby, soccer, softball, volleyball.

DANCE: Ballet, ballroom, folk, modern, square, dance composition, dance performance.

Lower Division courses

PE 131. **Physical Education Foundations.**
3 hours. 3 ①
Qualifications for teaching and coaching; place of physical education and athletics; values to development of children and youth; general purposes of program.

PE 132. **Pretherapy.**
2 hours. 2 ①
Qualification needed to become registered physical therapist or occupational therapist. Relationship of physical therapy and occupational therapy to field of medicine; values.

PE 194. **Professional Activities.**
2 hours each term, three terms. 2 ②
Grades K-12: movement fundamentals, basic rhythms, track and field. *Elementary School:* sports skills, gymnastics, rhythms.

PE 199. **Special Studies.**
Terms and hours to be arranged.

PE 211. **Philosophical Basis of Human Movement.**
3 hours. 3 ①
Value systems related to human movement; historical background of philosophy, sport, dance and exercise; contemporary education philosophies; application of leading contemporary philosophical tendencies to persistent human movement problems.

PE 212. **Human Movement Aesthetics.**
3 hours. 3 ①
Human movement and communication; discrimination of symmetry, rhythm, balance, and composition; somatic form in motion; sensory form from kinesthetic perception; symbolic import of the somatic and sensory forms.

PE 231. **Physical Fitness and Contemporary Living.**
3 hours. 3 ②
Physiological, kinesiological, and energy aspects of movement activities and exercise related to hypokinesia and physical fitness; laboratory experiences in jogging, weight training, and swimming.

PE 232. **Orienteering and Backpacking.**
3 hours. 2 ① 1 ③
Land navigation related to mountaineering, wilderness travel, and ski touring; backpacking for semi-expeditions; manpack equipment, energy expenditure, climatic factors, seasonal travel, and bivouac routine.

PE 233. **Mountaineering.**
3 hours. 2 ① 1 ③
Mountaineering techniques for snow, ice, and rock climbing with emphasis on altitude physiology, glacier travel, crevasse and alpine rescue, and avalanche safety. Two 3-day mountain trips to Oregon Cascades. Prerequisite: PE 232.

PE 234. **SCUBA Diving.**
3 hours. 1 ① 2 ②
Essential survival skills and knowledges for free and SCUBA diving; National Association of Underwater Instructor's certification upon successful completion of course. Field trips to be arranged. Prerequisite: Intermediate swimming skill.

PE 240. **Sports Leadership.**
3 hours. 3 ①
Organization of sports programs in non-academic settings; personnel, facilities, equipment, crowd control.

PE 259. **Care and Prevention of Athletic Injuries.**
2 hours. 1 ① 1 ②
Athletic injuries; practical and theoretical aspects of massage, taping, and bandaging; diet and conditioning; various physical therapeutic procedures. Prerequisite: First Aid Certificate; Z 322.

PE 294. **Professional Activities.**
2 hours each term, three terms. 2 ②
Grades K-12: basketball, volleyball, gymnastics, hockey, soccer (women), football, soccer (men). *Elementary School:* physical fitness, team sports. Prerequisite: competency.

Upper Division Courses

Courses numbered 400-499 and designated (g) may be taken for graduate credit.

PE 311. **Psychological Basis of Human Movement.**
3 hours. 3 ①
Motor performance and skill learning; perception and movement; personality and the performer; psychological concepts relating to physical performance, sport, and athletics. Prerequisite: Psy 200.

PE 312. **Sociological Basis of Human Movement.**
3 hours. 3 ①
Games, play, dance, and sport in contemporary society; relationships between movement forms and socialization processes; social control, conflict, change, and stratification. Prerequisite: sociology or anthropology course.

PE 313. **Motor Development.**
3 hours. 3 ①
Motor growth and development with emphasis on psychomotor learning. Prerequisite: Z 322.

PE 320. **Elementary School Physical Education.**
3 hours. 3 ①
Purposes; progressive programs for grades K-9; obtaining objectives; evaluation.

PE 323. **Kinesiology.**
3 hours. 2 ① 1 ②
Action of muscles and skeleton in motor activities. Prerequisite: Z 321,322.

PE 333,334,335. **Physical Education Practicum.**
2 hours each term. 4 ①
Field experience under professional supervision. Prerequisite: Two terms of professional activity or PE 132.

PE 340. **Intramural Sports Programs.**
2 hours. 2 ①
Program for high schools and colleges; aims and objectives; organizing a program; units of competition; program of sports; methods of competition; scoring plans; administration.

PE 357,358,359. **Athletic Training Internship.**
3 hours each term. 1 ① 3 ②
Laboratory application of athletic training for prevention, treatment, and rehabilitation of athletic injuries. Prerequisite: PE 259.

PE 360. **Sports Officiating.**
3 hours. 3 ①
Rules, mechanics, and procedures for competitive sports; enforcement of rules, use of signals; personal appearance and conduct, public relations, duties of officials; suggestions for coaches and administrators, code of ethics, and qualifications for national official's rating.

PE 361. **Aquatic Production.**
3 hours. 3 ①
Development of aquatic production programs including planning, staging, lighting, sound production, and composition. Prerequisite: Professional activity (aquatics).

PE 362. **Tennis Coaching.**
2 hours. 2 ① 1 ②
Coaching competitive tennis; strategy and and tactics, physiological and psychological aspects, team organization. Prerequisite: professional activity (tennis).

PE 363. **Gymnastics Coaching.**
2 hours. 2 ① 1 ②
Developing competitive gymnastics teams; conducting meets; judging procedures, coaching problems; facilities and equipment; safety procedures. Prerequisite: Professional activity (gymnastics).

PE 364. **Swimming and Diving Coaching.** 2 hours. 2 ① 1 ②
Stroke mechanics, coaching psychology, swimming physiology, meet operation, rule interpretations, pool design, and training programs. Prerequisite: Professional activity (aquatics).

PE 365. **Football Coaching.**
2 hours. 2 ① 1 ②
Theory and practice, details of each position, training and managing, complete techniques of developing offensive and defensive tactics, comparison of various systems in football. Prerequisite: Professional activity (football).

PE 366. **Basketball Coaching.**
2 hours. 2 ① 1 ②
Coaching and training of basketball teams beginning with fundamentals, passing, dribbling, and pivoting; psychology of the game; various methods of defense and offense. Prerequisite: Professional activity (basketball).

PE 367. **Baseball Coaching.**
2 hours. 2 ① 1 ②
Batting, pitching, baseball strategy, how to play various positions; promoting the game; making schedules; points of inside baseball; care and construction of field; management. Prerequisite: PE 294.

PE 368. **Track and Field Coaching.**
2 hours. 2 ① 1 ②
How to train for events; form and technique; conduct of meets; construction, use, and assembling of equipment; development of certain types of individuals for certain events. Prerequisite: Professional activity (track and field).

PE 369. **Wrestling Coaching.**
2 hours. 2 ① 1 ②
Offense and defense in modern wrestling; equipment and facilities; meets and tournaments; coaching problems; wrestling styles; weight training and conditioning. Prerequisite: Professional activity (wrestling).

PE 394. **Professional Activities.**
2 hours each term, three terms. 2 ②
Grades K-12: aquatics, developmental activities, self-defense, tennis, golf, wrestling (men). *Elementary School:* games and relays, rhythms, posture and conditioning. Prerequisite: competency.

[1]PE 401. **Research.** (g)

[1]PE 405. **Reading and Conference.** (g)

[1]PE 406. **Projects.** (g)

[1]PE 407. **Seminar.** (g)

[1]PE 408. **Workshop.** (g)
Terms and hours to be arranged.

PE 433. **Physiology of Exercise.** (g)
3 hours. 2 ① 1 ②
Physiological effect of physical activity. Prerequisite: Z 331,332.

PE 434. **Biomechanics of Motor Activities.** (g)
3 hours. 2 ① 1 ②
Biomechanical concepts involved in analysis of motor activities; force, equilibrium, and motion. Prerequisite: Mth 102; physical science sequence; PE 323.

PE 441. **School Programs.**
4 hours. 4 ①
Administrative policies and practices; curricular programs and variations from kindergarten through grade 12. Prerequisite: PE 320 or PE 333.

PE 443. **Evaluation of Physical Education.** 3 hours. 3 ①
Techniques for evaluating knowledge, skill, attitudes, appreciations, and organic vigor through physical education instruction. Prerequisite: PE 333 or 320.

PE 444. **Adapted Physical Education.** (g) 3 hours. 3 ①; lab to arrange.
Organization, administration, methods of teaching human movement for the exceptional person. Prerequisite: PE 423,433.

PE 446. **Tests and Measurements in Physical Education.** (g)
3 hours. 3 ①
Typical tests; scoring; test construction. Prerequisite: PE 443.

PE 447. **Concepts of Physical Activity.** (g) 3 hours. 3 ①
Development of basic concepts and their relationship to physical activity programs. Prerequisite: PE 211.

PE 448. **Administration of Physical Education.** (g)
3 hours. 3 ①
Problems; organization of departments and of instructional and recreational programs; supervision of physical plant. Prerequisite: PE 441.

PE 449. **Current Trends and Problems.** (g) 3 hours. 3 ①
Trends and underlying forces in health, physical education, and recreation; implications of recent developments for administrative responsibility and planning for programs in schools and college. Prerequisite: Ed 416.

PE 451. **Competitive Athletics.** (g)
3 hours. 3 ①
Analysis of competitive athletic programs in schools and colleges with emphasis on new developments and findings. Prerequisite: PE 441.

[1] Credit for PE 401,405,406,407,408 singly or combined must not exceed 9 hours.

PE 452. **History of Physical Education.** (g) 3 hours. 3 ①
History of physical education from early societies to modern times. Prerequisite: PE 211 or 312.

PE 453. **Research in Physical Education.** (g)
3 hours. 3 ①
Review of research with application of results to school and college physical education programs. Prerequisite: PE 446.

PE 454. **Therapeutic Physical Education.** (g)
3 hours. 3 ①
Therapeutic programs including basic principles, evaluative procedures, activities, and organization. Prerequisite: PE 444.

PE 455. **Facilities.** (g)
3 hours. 3 ①
Planning construction of indoor and outdoor physical education facilities; relationship of staff, architect, and community; analysis of gymnasium and field spaces. Prerequisite: PE 448.

PE 456. **Perceptual Motor Skill Training.** (g)
3 hours. 3 ①
Relationship between motor learning and communicative skills; use of testing instruments; experience with underachieving students. Prerequisite: Ed 416.

PE 457. **Curriculum Construction.** (g)
3 hours. 3 ①
Analysis of physical education curriculum; state and local curriculum programs; developing curriculum materials for schools and colleges. Prerequisite: PE 441.

PE 458. **Supervision.** (g)
3 hours. 3 ①
Supervisory practices and organization applied to physical education program development. Prerequisite: PE 448, 457.

PE 459. **Athletic Training Programs.**
3 hours. 3 ①
Athletic training programs; medical-legal implications of athletic training; professional personnel relationships; current issues and problems. Prerequisite: PE 357.

PE 494. **Professional Activities.**
2 hours. 2 ②
Grades K-12: badminton, bowling, modern dance, games and relays. Prerequisite: competency.

HOME ECONOMICS

FACULTY

As of January 1974

BETTY E. HAWTHORNE, Ph.D., Dean of the School of Home Economics
AVA MILAM CLARK, M.A., Dean Emeritus
ANN LITCHFIELD, Ph.D., Associate Dean
ELAINE K. CARLSON, M.S., Assistant Dean
MARYANNE STATON, Associate Professor, Coordinator of AoA Short-Term Nutrition Training
CONSTANCE PLANTS, B.S., Coordinator, Learning Resource Center
PROFESSORS EMERITUS Baker, Brandon, Clark, Cleaveland, Edaburn, Fincke, Fulmer, Funk, Garrison, Gatton, Kirkendall, Mack, Mackey, Patterson, Prentiss, Scales, Sinnard, Storvick, Strawn, Tank, Taskerud, Van Horn, Ware, Wells, Woodring

Clothing, Textiles, and Related Arts: PROFESSOR Petzel (head)
ASSOCIATE PROFESSORS Diedesch, Gates, Ledbetter, Moser
ASSISTANT PROFESSORS Bubl, Grant, Higa, Thiel
INSTRUCTORS Crews, Wilhelmson

Family Life: PROFESSORS O'Neill (head), Anderson, Gravatt
ASSOCIATE PROFESSOR Carlin
ASSISTANT PROFESSORS Connelly, DeJardin, Massey, Morris, Sugawara
INSTRUCTORS Burrows, Bruland, Clarke, Dematteis

Foods and Nutrition: PROFESSORS Woodburn (head), Charley, Hawthorne, Yearick
ASSOCIATE PROFESSORS Barte, Bussard, East, Johnson, Miller, Peters
ASSISTANT PROFESSORS Benson, Forest, Kelsey, Lewis
SENIOR INSTRUCTOR Edwards
INSTRUCTORS Allen, Brineman, Miner, Cale, Schweitzer

Home Economics Education: ASSOCIATE PROFESSOR Lee (head)
ASSISTANT PROFESSORS Grieve, Schrimsher
INSTRUCTOR Robinson

Home Management: Dean Hawthorne (acting head)
PROFESSOR Johnston
ASSOCIATE PROFESSORS Brown, East, Plonk
ASSISTANT PROFESSORS Beckwith, Crabtree, Harter, Higa, Vars
INSTRUCTOR Soeldner

Institution Management: PROFESSOR Harger (head)
INSTRUCTORS Monson, Parker, K. Scoggin, P. Scoggin

HOME ECONOMICS at Oregon State University is an integrated group of subject-matter areas centered around the needs of the family and its individual members and the interrelationships of families and society. Principles derived from the sciences, social sciences, humanities, and arts are applied to problems of food, clothing, the home environment, human growth and development, management of individual and family resources, and interpersonal relations.

The total home economics program of the University—undergraduate and graduate instruction, research, extension and public service—is concerned with improving the quality of individual and family life in a changing society.

The undergraduate curriculum of the School of Home Economics has a two-fold aim: to provide a liberal education to prepare students for their responsibilities as individuals, family members, and citizens; and to provide a professional education. Professional fields for which students can prepare include: teaching in public schools; adult education; early childhood education; home economists in business with food, clothing, textile, home furnishing, appliance, and utility companies; merchandising and fashion; communications; hospital dietetics; food service management; extension service at home or abroad; and health, welfare, social, and community services. Students may prepare for graduate study leading to research, college and university teaching, and other specialized professional positions.

With the critical effects of economic, social, cultural, and technological changes on today's society, and with increasing pressures on families and their individual members, the need for well-educated professional home economists continues to expand.

Curricula in Home Economics

Degree Programs

The Bachelor of Science (B.S.) and Bachelor of Arts (B.A.) degrees are offered with a major in Home Economics. For a B.S. or B.A. degree, all home economics majors must satisfactorily complete the *common requirements* plus the additional requirements of *one of the nine areas of concentration:* Child Development and Family Life; Clothing, Textiles, and Related Arts; Foods and Nutrition; General Home Economics; Home Economics Education; Home Economics with Communications; Institution Management and Dietetics; Family Economics, Housing, and Management; Nursery School Teaching. The *area of concentration* is indicated on the diploma.

Additional requirements for the Bachelor of Arts degree are listed on page 14.

Advanced degrees in home economics offered through the Graduate School are the Master of Science (M.S.), Master of Arts (M.A.), Master of Home Economics (M.H.Ec.), and Doctor of Philosophy (Ph.D.). The M.S. and M.A. degrees are offered with a major in any of the departments. A student may work toward the M.H.Ec. degree in general home economics only. The Ph.D. is offered in foods, nutrition, child development, family relations, and home management.

Graduate students in home economics have the opportunity to work with the faculty in research projects. The School cooperates with the Agricultural Experiment Station in research programs and undertakes studies supported by federal, state, private, and general research funds.

Transfer students must take a minimum of 15 hours of home economics courses at Oregon State University, the courses to be determined by the department or committee responsible for the student's major.

The student whose education is interrupted must take a minimum of 12 hours of home economics courses at Oregon State University within five years of graduation, the specific courses to be determined by the department or committee responsible for the student's major. Further, this student must take a minimum of 15 term hours of science and social science, with at least 4 term hours in each (not necessarily in residence at Oregon State University) within 10 years of graduation. The specific courses shall be approved by the department or committee responsible for the student's major. Additional recency requirements for the several areas of concentration may be prescribed by the department or committee concerned.

The University Honors Program in the School of Home Economics is coordinated with the programs in other Schools and administered by the Director of the University Honors Program (see page 30). Information concerning eligibility and application forms may be obtained from the Director.

Special Programs

One-year and two-year students

Students who are interested in home economics but who are not candidates for degrees may plan, with the help of their advisers, combinations of courses to meet individual capabilities and interests. In such programs students may include a variety of courses in other schools and departments on the campus for which they have the necessary background.

Correspondence Study

A limited number of home economics courses are offered by correspondence through the Division of Continuing Education of the Oregon State System of Higher Education independent study program.

The Merrill-Palmer Institute

The School of Home Economics carries an affiliation with the Merrill-Palmer Institute in Detroit. Students interested in any phase of child development, family relations, or social service work may apply for study at the Merrill-Palmer Institute during one term of their junior or senior years. For information about applications, see the dean of the School of Home Economics.

Preparation

A sound high school background in English, mathematics, sciences, and social sciences is necessary. Electives in home economics, a foreign language, art, and journalism are recommended.

Academic Advising

Academic advising is regarded as an important responsibility by faculty. Each student is considered as an individual and his or her study program is developed in personal consultation with a faculty adviser based on the student's background, aptitudes, interests, and academic progress.

Career information compiled in the Learning Resource Center is an additional source of assistance to students in making decisions about majors and career choices.

Common Requirements

For All Students Majoring in Home Economics

Humanities ..... *27 hours*

English Composition, Wr 121 (6 hours additional writing and/or demonstrated proficiency)
Speech
At least three other areas, one in depth (5 hours or more) to include Basic Design (Art 195) or Introduction to the Visual Arts (Art 161). Others selected from art, architecture, communications (writing, speech, journalism), history, literature, modern languages, music, philosophy, religious studies. (No more than 3 hours in performing arts.)

Social and Natural Sciences ..... *45 hours*

Social sciences (minimum, 13 hours), two areas selected from:
General Psychology (Psy 200)
General Sociology (Soc 204, 205)
Principles of Economics (Ec 213, 214)
Cultural Anthropology (Anth 106)

Natural sciences
One laboratory sequence of at least three terms in a physical or biological science area and at least one course in the other area, selected from:
Physical Sciences—chemistry, physical science, physics
Biological Sciences—gen biol, botany, microbiol, physiology, zoology
Intermediate Algebra (Mth 95) or demonstrated proficiency

Additional social and/or natural sciences to fulfill 45 hour requirements

Physical Education and Personal Health (H 160) ..... *5 hours*

Home Economics ..... *21 hours*

Orientation to Home Economics (HEc 101), 1 hour
Contemporary American Families (FL 240), 3 hours
Child Development (FL 225), 3 hours
Textiles (CT 250) or Clothing and Man (CT 211)*, 3 hours
Nutrition (FN 225), 4 hours
Family Housing and Its Environment (HM 235), 3 hours
Decision-Making and the Consumer (HM 250), 3 hours
Home Economists in Society (HEc 410), 1 hour

* A choice of Clothing and Man or Textiles is allowed in the following Areas of Concentration: Child Development and Family Life, Foods and Nutrition, Institution Management and Dietetics, and Nursery School Teaching. *Textiles is required in all others.*

Freshman Year

Freshmen in Home Economics usually take 48 hours during the three terms and in conference with their advisers select courses from the following:

	Hours
Orientation to Home Economics (HEc 101)	1
Basic Design or Introduction to the Visual Arts (Art 195 or 161)	4
Science sequence with laboratory	9–13
English Composition (Wr 121)	3
Speech	3
Intermediate Algebra (Mth 95) if not exempt	(4)
Nutrition (FN 225)	4
Child Development (FL 225)	3
Textiles (CT 250) and/or Clothing and Man (CT 211)	3–6
Contemporary American Families (FL 240)	3
Decision-Making and the Consumer (HM 250)	3
Courses from Humanities, Social Sciences or Area of Concentration	0–9
Physical Education activities and Personal Health	3–4

Sophomore, Junior, and Senior Years

The curriculum in the sophomore, junior, and senior years is designed to provide the professional proficiencies required by one or more of the several fields of home economics.

Requirements for Areas of Concentration are listed on the following pages.

AREAS OF CONCENTRATION
Additional and/or Specific Requirements

CLOTHING, TEXTILES, AND RELATED ARTS

General Requirements for all CTRA Options

HUMANITIES	*Hours*
Basic Design (Art 195)	4
SOCIAL AND NATURAL SCIENCES	
Principles of Economics (Ec 213)	4
Hist of Western Civ (Hst 101,102,103 or Hst 121,122)	9–10
General Psychology (Psy 200)	5
HOME ECONOMICS	
Textile Laboratory (CT 251)	1

Additional Requirements for Options

Clothing and Textiles in Business Option

Cloth Constr (CT 210 and 212 or 213)	5–6
Clothing and Man (CT 211)	3
Historic Costume (CT 309)	3
Home Furnishing (CT 331)	3
Consum Buy in Cloth and Text (CT 350)	3
Fashion Merchandising (CT 470)	3
Upper div cloth, text, and rel arts	8–11
Personal and Family Finance (HM 341)	3
Introduction to Bus Data Proc (BA 131)	3
Marketing (BA 312)	4
Business Administration courses selected from: Basic Accounting and Financial Analysis (BA 217), Business Law (BA 315), Behavior in Organizations (BA 361), Marketing Management (BA 471), Management of Marketing Communications (BA 473), Consumer Behavior (BA 476)	10

Home Furnishings Option

Clothing Construction (CT 210 or 213)	3–5
Home Furnishing (CT 331)	3
Textiles for Interiors (CT 352)	2
Projects (Home Furnishing) (CT 406)	3
Upper div home furn and textile courses	9
Org and Use of House Space (HM 335)	3
Personal and Family Finance (HM 341)	3
Housing and Arch Phil (AA 178)	3
Intro to Art History (Art 261,262,263)	9
Basic Account and Finan Anal (BA 217)	3
Marketing (BA 312)	4

Pregraduate Study Option

A student preparing for graduate study leading toward college teaching and/or research may plan a special program with emphasis in CTRA, and the supporting social sciences, sciences, and/or humanities to include a minimum of 25 additional hours of CTRA and 30-40 additional hours in supporting disciplines.

Electives

Varies with Option; must include sufficient upper division courses to insure total of 45 upper division hours 30–45

GENERAL HOME ECONOMICS

Requirements

HUMANITIES	*Hours*
Common requirements only	
SOCIAL AND NATURAL SCIENCES	
General Psychology (Psy 200)	5
HOME ECONOMICS	
Clothing and Man (CT 211)	3
Clothing Construction (CT 210 or 213)	3–5
Home Furnishing (CT 231 or 331)	3
Child Development (FL 311)	3
Foods (FN 215 or 220,221)	5–8
Fam Nutr (FN 325) or Meal Mgmt (FN 313)	3
Personal and Family Finance (HM 341)	3
Upper division courses: Clothing, Tex and Related Arts (3 hrs) Family Life (3 hrs) Home Management (3 hrs) Choice (5-6 hrs)	14–15

Electives

Must include sufficient upper division courses to insure total of 45 upper division hours 54–59

HOME ECONOMICS WITH COMMUNICATIONS

General Requirements for all Communications Options

HUMANITIES	*Hours*
Fundamentals of Speech (Sp 111)	3
Radio, Television, and Film Speaking (Sp 262)	3
Journalism (J 111,112,121)	7
Upper division speech or journalism	3
Approved electives in speech, journalism, writing, art, or business administration	11
SOCIAL SCIENCE, NATURAL SCIENCES	
Principles of Economics (Ec 213 or 214)	4
HOME ECONOMICS	
Clothing and Man (CT 211)	3
Home Furnishing (CT 231 or 331)	3
Family Life elective	2–3
Household Equipment (HM 330)	3
Personal and Family Finance (HM 341)	3
Foods (FN 215)	5

Additional Requirements for Options

General Home Economics Option

Upper division courses in foods and nutrition and/or institution management, clothing, textiles, and related arts, family life and home management	17–18

Clothing and Textiles Option

History of Western Civ (Hst 101,102,103 or 121,122) in addition to the minimum 13 hours of social science	9–10
Clothing Construction (CT 210 or 213)	3–5
Consumer Buying of Cloth and Text (CT 350)	3
Historic Costume (CT 309) or Historic Textiles (CT 460)	3
Upper division courses in CTRA	11

Foods and Nutrition Option

General Chemistry (Ch 201,202,203 or Ch 104,105,106)	9–13
Physiology (Z 331, 332)	6
Introductory Microbiology (Mb 130) (Foods (FN 220,221) concurrent with organic chemistry *recommended* in place of FN 215)	3
Meal Management (FN 313)	3
Family Nutrition (FN 325)	3
Family Food Buying (FN 411)	3
Food Demonstrations (FN 410)	3
Upper division courses in FN and/or institution management	6

Electives

Varies with Option; must include sufficient upper division courses to insure total of 45 upper division hours 44–50

CHILD DEVELOPMENT AND FAMILY LIFE

Requirements

HUMANITIES	*Hours*
Common requirements only	
SOCIAL AND NATURAL SCIENCES	
General Psychology (Psy 200)	5
General Sociology (Soc 204,205)	6
Upper division sociology, psychology, or anthropology	9
Physiology (Z 331,332)	6
Introduction to Statistics (St 311)	3
HOME ECONOMICS	
Child Development (FL 311)	3
Directed Experience with Preschool Children (FL 425)	3
Development in Middle Childhood and Adolescence (FL 413)	3
Marriage Preparation (FL 222) or Family Living (FL 223)	2
Family Relationships (FL 322)	3
Upper division courses in Family Life	6
Family Nutrition (FN 325)	3
Personal and Family Finance (HM 341)	3
Community Services and Welfare of Families (HM 445)	3
Home Economics courses other than Family Life	12

Electives

Electives	52

HOME ECONOMICS EDUCATION

Requirements

HUMANITIES	*Hours*
Basic Design (Art 195)	4
SOCIAL AND NATURAL SCIENCES	
General Psychology (Psy 200)	5
Principles of Economics (Ec 213)	4
General Sociology (Soc 204)	3
General Sociology (Soc 205) or Principles of Economics (Ec 214)	3–4
Physiology (Z 331,332)	6
HOME ECONOMICS	
Clothing and Man (CT 211)	3
Clothing Construction (CT 210 and 212 or 213)	5–6
Home Furnishing (CT 231 or 331)	3
Child Development (FL 311)	3
Family Relationships (FL 322)	3
Directed Experience with Preschool Children (FL 425)	3
Foods (FN 215 or 220,221)	5–8
Meal Management (FN 313)	3
Personal and Family Finance (HM 341)	3
Household Equipment (HM 330) or Organization and Use of House Space (HM 335)	3
Home Management House (HM 450) or Management in the Home (HM 460) (for married students)	4
EDUCATION	
For diploma designation "Home Economics Education" courses selected from the list below	18
For recommendation for Oregon State Basic Vocational Home Economics and Senior High School Certification *all* courses listed below	33–37
School in American Life (Ed 310)	3
Educational Psychology (Ed 312)	3
Methods of Reading (Ed 350)	3
Special Secondary Methods (Ed 408d)	3
Student Teaching (Ed 416)	12–15
Seminar: Student Teaching (Ed 407)	1
Seminar: Problems of Beginning Teachers (HEd 407)	2–3
Organization and Administration of Homemaking Education (HEd 422)	3
Psychology of Adolescence (Ed 461)	3

Electives

With diploma designation only	31–34
Meeting certification requirements	15–23

NURSERY SCHOOL TEACHING

Requirements

HUMANITIES	*Hours*
Common requirements only	
SOCIAL AND NATURAL SCIENCES	
General Psychology (Psy 200)	5
Soc or anth including General Sociology (Soc 204) if not taken in sequence	9
Prin and Tech of Speech Cor (Sp 493)	3
Physiology (Z 331,332)	6
Introduction to Statistics (St 311)	3
HOME ECONOMICS	
Child Development (FL 311)	3
Family Relationships (FL 322)	3
Development in Middle Childhood and Adolescence (FL 413)	3
Directed Experience with Preschool Children (FL 425)	3
Ed Prog for Preschool Children (FL 427)	5
Supervised Nursery School Exp (FL 429)	9–12
Curr Enrichment for Young Chil (FL 428)	4
Family Nutrition (FN 325)	3
Personal and Family Finance (HM 341) or Com Serv and Wel of Fam (HM 445)	3
Home ec courses other than family life	6

Electives

Electives	40–46

INSTITUTION MANAGEMENT AND DIETETICS

General requirements for both Options

HUMANITIES	*Hours*
Common requirements only	

SOCIAL AND NATURAL SCIENCES

General Psychology (Psy 200)	5
General Sociology (Soc 204,205 + 3 hours) or Principles of Econ (Ec 213,214)	8–9
Ec 213 or Soc 204	3–4
General Chemistry (Ch 201,202,203 or Ch 104,105,106 or Ch 204,205,206)	9–15
Organic Chemistry or Ch 334,335,336)	8–9
Elementary Biochemistry (BB 350)	4
Physiology (Z 331,332)	6
Introductory Microbiology (Mb 130) or General Microbiology (Mb 304)	3–5

HOME ECONOMICS

Foods (FN 220,221 or 215,335)	8
Meal Management (FN 313)	3
Nutrition (FN 417,418,419)	7
Quantity Food Production (IM 311)	4
Purchasing for Institutions (IM 440)	5
Organization and Management of Food Services (IM 445)	5

Additional Requirements for Options

Educational Psychology (Ed 312)	3
Accounting (BA 217), Personnel Management (BA 467)	6

General Dietetics Option

Personal and Family Finance (HM 341)	3
Nutrition in Disease (FN 420)	3
Upper division courses in foods and nutrition or institution management	3

Management Option

Principles of Economics (Ec 213,214) *required sequence*	
Labor Economics (Ec 427)	3
Introduction to Business Data Processing (BA 131) or Statistical Methods (St 451)	3–4
Organization and Mgmt Theory (BA 302)	4
Personal and Family Finance (HM 341) or Household Equipment (HM 330)	3
Projects (IM 406) or Inst Exper (IM 450)	3–4

NOTE: Both Options meet American Dietetic Association academic requirements.

Electives

Varies with Option; must include sufficient upper division courses to insure total of 45 upper division hours 24–45

FAMILY ECONOMICS, HOUSING, MANAGEMENT

Requirements

HUMANITIES	*Hours*
House Planning and Arch Phil (AA 178)	3

SOCIAL AND NATURAL SCIENCES

Principles of Economics (Ec 213,214)	8
General Psychology (Psy 200)	5
General Sociology (Soc 204,205 + 3 hours)	9
Introduction to Statistics (St 311)	3

HOME ECONOMICS

Clothing and Man (CT 211)	3
Foods (FN 215)	5
Meal Management (FN 313)	3
Household Equipment (HM 330)	3
Organ and Use of House Space (HM 335)	3
Personal and Family Finance (HM 341)	3
Home Management House (HM 450) or Management in the Home (HM 460) (for married students)	4
Courses to be selected from: Consumer Economics (HM 412) House Planning in Rel to Function (HM 435) Family Housing (HM 439) Management in Family Living (HM 440) Economics of the Family (HM 441) Com Serv and Wel of Fam (HM 445)	6
Home economics courses other than Home Management (to insure 24 upper division hours in home economics)	6

Electives

Must include sufficient upper div courses to insure total of 45 upper div hours 60

FOODS AND NUTRITION

General Requirements for all FN Options

HUMANITIES	*Hours*
No specific requirements common to all options	

SOCIAL AND NATURAL SCIENCES

General Chemistry (Ch 201,202,203 or Ch 104,105,106 or Ch 204,205,206)	9–15
Organic Chemistry (Ch 226,227,228 or Ch 334,335,336)	8–9
Introductory Microbiology (Mb 130) or General Microbiology (Mb 304)	3–5
Physiology (Z 331,332)	6

HOME ECONOMICS

Personal and Family Finance (HM 341)	3
Foods (FN 220,221 or FN 215,335)	8
Meal Management (FN 313)	3
Nutrition (FN 417,418,419)	7

Additional Requirements for Options

General Foods and Nutrition Option

General Chemistry Lab (Ch 107 or 207)	2
Organic Chemistry Laboratory (Ch 229)	2
Quantitative Analysis (Ch 234)	4
Elementary Biochemistry (BB 350)	4
Intermediate Algebra (Mth 101)	4
Trigonometry (Mth 102)	4
(General Botany (Bot 201) recommended)	
Major courses selected from: Family nutrition (FN 325) Food Demonstrations (FN 410) Family Food Buying (FN 411) Home Food Preservation (FN 414) Food Economics (FN 415) Cultural Aspects of Foods (FN 416) Nutrition in Disease (FN 420) Child Nutrition (FN 421) Advanced Foods (FN 425) Experimental Food Studies (FN 435) Research (FN 401) Reading and Conference (FN 405) Seminar (FN 407) Quantity Food Production (IM 311) Household Equipment (HM 330)	12

Clinical and Therapeutic Dietetics and Community Nutrition Options*

Common Requirements

Adv Exp Writing (Wr 316) or Tech Report Writing (Wr 327)	3
General Psychology (Psy 200)	5
General Sociology (Soc 204,205) or Principles of Economics (Ec 213,214)	6–8
Ec 213 or Soc 204	3–4
Nutrition in Disease (FN 420)	3
Quantity Food Production (IM 311)	4
Org and Mgmt of Food Services (IM 445)	5
Ed Psych: Learning (Ed 312)	3
Stat Methods (St 451) or Intro to Stat (St 311,312)	4–6

Clinical and Therapeutic Dietetics Option

Specific Requirements

General Chemistry Lab (Ch 107 or 207)	2
Organic Chemistry Laboratory (Ch 229)	2
General Biochemistry (BB 450,451)	7
Biochemistry Laboratory (BB 493)	2
Intermediate Algebra (Mth 101)	4
Trigonometry (Mth 102)	4
Child Nutrition (FN 421)	3
(Cultural Anthropology and Genetics (Bi 341) recommended)	

Community Nutrition Option

Specific Requirements

Elementary Biochemistry (BB 350)	4
Family Nutrition (FN 325)	3
Seminar: Community Nutrition (FN 407)	3
Field Experience (FN 406)	3
Comm Serv and Welfare of Families (HM 445) or Community Organization (Soc 475)	3
(Food Economics (FN 415) or Family Food Buying (FN 411) recommended	

Electives

Varies with option: Must include sufficient upper division courses to insure total of 45 upper division hours 23–48

* Both Options meet American Dietetic Association academic requirements.

Special Emphases

Home Economics and Extension

Home Economics majors interested in preparing for positions as Cooperative Extension Service Home Economists may have a general background in home economics, such as General Home Economics, Home Economics Education, or Home Economics with Communication, or may elect one of the special areas of concentration. Election of chemistry, microbiology, languages, social psychology, consumer economics, and courses to enhance the student's understanding of communication, human behavior, social issues, special audiences, and teaching methods are recommended. For an Extension career in home economics, a Bachelor's degree and evidence of admissability to a graduate degree program are required. A graduate degree and extension field experience are preferred.

Home Economics and Social or Community Services

Students interested in preparing for professional opportunities in social or community services, such as home economists, nutritionists, child welfare workers or caseworkers, may add a community and social welfare emphasis to majors in Family Economics, Housing, and Management; Foods and Nutrition; Child Development and Family Life; or General Home Economics. The election of selected courses in social sciences and home economics also allows the student to pursue graduate study in areas such as Social Work and Public Health Nutrition.

Interdisciplinary Programs

The School of Home Economics cooperates with other professional schools and departments to provide degree programs in Residential Institution Management and Hotel and Restaurant Management. For complete description of these programs see page 83.

Courses in Home Economics

CLOTHING, TEXTILES, AND RELATED ARTS

The Department of Clothing, Textiles, and Related Arts offers instruction in the areas of clothing, textiles, and home furnishings.

Advanced courses are offered for students preparing for positions in retailing, home furnishings, promotional work for manufacturers of clothing, textiles, and home furnishings, and for graduate work leading to research and college teaching.

Graduate work is offered in the three areas leading to the Master of Arts and Master of Science.

Lower Division Courses

CT 199. Special Studies.
Terms and hours to be arranged.

[1]CT 210. Clothing Construction.
3 hours. 1 ① 2 ②
The application of basic principles and techniques of construction and fitting to projects adapted to the level of the individual student.

CT 211. Clothing and Man.
3 hours. 2 ① 1 ①
Sociological, psychological, economic, and aesthetic factors affecting the selection of clothing.

[1]CT 212. Clothing Construction.
3 hours. 3 ②
Advanced construction techniques with emphasis on creativity. Principles of pattern alteration and fitting. Prerequisite: CT 210, 211,250.

[1]CT 213. Clothing Construction.
5 hours. 3 ① 2 ③
Fundamentals of fabric selection, construction techniques, pattern alteration, and fitting. Emphasis on organization, creativity, and consumer responsibility. Prerequisite: one year of clothing construction in high school, or equivalent.

[1]CT 231. Home Furnishing.
3 hours. 3 ①
The home and its furnishings in relation to function, beauty, and cost.

[1]CT 235. Textile Design: Weaving.
3 hours. 3 ②
Design and projects for frameloom, circular, card, and inkle weaving. Simple looms constructed for each project.

CT 250. Textiles.
3 hours. 3 ①
Properties, identification, selection, use, and care of textile fibers and fabrics.

CT 251. Textile Laboratory.
1 hour. 1 ②
Identification and analysis of fiber, yarn, fabric construction, color, and finish in textiles. Prerequisite or parallel: CT 250.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

CT 309. Historic Costume.
3 hours. 3 ①
Relation of historic costume to the social and cultural environment and to modern dress. Prerequisite: CT 250; one year of history.

CT 310. Flat Pattern and Draping.
3 hours. 3 ②
Flat pattern study; draping on half-size dress forms; principles of fitting and construction of an individualized design. Prerequisite: CT 212 or 213, 250.

CT 311. Fashion Design.
3 hours. 1 ① 2 ②
Designing fashionable ensembles for various occasions and figure types. Prerequisite: CT 210 or 213, CT 211; Art 195.

CT 312. Tailoring. 4 hours. 2 ① 2 ③
Principles of tailoring applied to the construction of a coat or suit. Prerequisite: CT 212 or 213,250.

CT 320. Clothing for Children.
3 hours. 1 ① 1 ② 1 ③
Selection and construction of garments related to a child's physical and social development. Prerequisite: CT 212 or 213,250.

CT 322. Construction with Special Fabrics.
3 hours. 2 ③
Basic techniques for single and double knits, tricot, elasticized fabric, and other special materials. Prerequisite: CT 212 or 213,250.

[1]CT 331. Home Furnishing.
3 hours. 2 ① 1 ②
Furnishing a home for comfort, beauty, convenience, and economy. Prerequisite: CT 250; AA 178 or HM 235; Art 195 or AA 187.

CT 332. Applied Home Furnishing.
3 hours. 1 ① 1 ② 1 ③
Window treatments and principles of drapery construction. Creative design and techniques applied to home furnishings using various textile media. Prerequisite: CT 210 or 213; Art 195.

[1]CT 335. Textile Design: Weaving.
3 hours. 3 ②
Design for weaving in loom and non-loom techniques. Fabric and handwoven garment design. Prerequisite: CT 250; Art 195 or AA 187.

CT 336. Textile Design: Dyeing.
2 hours. 2 ②
Creation of design on textiles through use of dyes and pigments. Prerequisite: CT 250; Art 195 or AA 187.

CT 350. Consumer Buying in Clothing and Textiles. 3 hours. 3 ①
Problems and aids in purchasing clothing and textiles. Prerequisite: CT 210 or 213, CT 211, 250; Ec 213.

CT 352. Textiles for Interiors.
2 hours. 2 ①
Types, qualities, and maintenance of functional and decorative fabrics for homes and public buildings. Use of specifications, standards, and legislation. Prerequisite: CT 250. CT 350 recommended.

CT 355. Textile Processing.
3 hours. 3 ①
Processing and manufacturing of fibers, yarns, and fabrics. Field trip required. Prerequisite: CT 250.

CT 401. Research.

CT 403. Thesis.
Terms and hours to be arranged

[1] Certain courses cover somewhat similar subject matter and credit cannot be granted for duplication. Credit cannot be granted for CT 213 and CT 210 or CT 212 or for CT 231 and CT 331.

CT 405. Reading and Conference.

CT 406. Projects.

CT 407. Seminar.

CT 408. Workshop.
Terms and hours to be arranged.

CT 410. Flat Pattern and Draping.
(G) 3 hours. 1 ① 1 ② 1 ③
Fitting experiences with varied designs and figures. Creative use of fabrics in the construction of one individualized garment. Prerequisite: CT 310.

CT 411. Fashion Design. (G)
3 hours. 1 ① 2 ②
Creative designing of clothing and accessories. Prerequisite: CT 311.

CT 413. Recent Advances in Textiles.
(g) 3 hours. 3 ①
Review of recent literature on textile fibers, yarns, fabric construction, color, finishes, maintenance, and labeling. Prerequisite: CT 250 and 12 hours in clothing, textiles, and related arts, including 3 upper division hours. Chemistry recommended.

CT 415. Clothing Throughout the Life Cycle. (g) 3 hours. 3 ①
Clothing for infancy through old age, including consideration of physical handicaps, occupational levels, and income factors. Prerequisite: CT 211,250.

CT 430. History of Furniture. (G)
3 hours. 3 ①
Historic furnishings in relation to architectural styles and interiors. Prerequisite: CT 331; Hst 101,102,103. CT 460,461 recommended.

CT 431. Contemporary Furnishings.
(G) 3 hours. 2 ① 1 ②
Designers, materials, and manufacturers of furnishings. Field trips required. Prerequisite: CT 430; AA 200.

CT 435. Textile Design. (G)
3 hours. 3 ②
Problems in double and tubular weave. Contemporary and historic techniques. Prerequisite: CT 335.

CT 451. Textile Fibers. (G)
3 hours. 2 ① 1 ②
Composition and chemical properties; relation to certain structural and physical characteristics. Prerequisite: CT 250,251; Ch 228,229.

CT 453. Textile Yarns and Fabrics.
(G) 3 hours. 1 ① 2 ②
Investigations of physical properties of yarns and fabrics; evaluation of data in relation to serviceability. Prerequisite: CT 250,251; one upper division textile course; chemistry or physics.

CT 460. Historic Textiles. (G)
3 hours. 3 ①
Textiles from ancient times to present from an appreciative and historical point of view. Prerequisite: CT 250; 3 hours of upper division clothing, textiles, and related arts; one year of history. Art 261,262,263 recommended.

CT 461. World Textiles. (G)
3 hours. 3 ①
National fabrics of past and present from each continent; tapestries, rugs, laces, embroideries, painted and printed fabrics. Prerequisite: CT 250; 3 hours of upper division clothing, textiles, and related arts; one year of history. Art 261,262,263 recommended.

CT 470. Fashion Merchandising.
3 hours. 1 ① 1 ②
Selection, buying, promotion, and selling of clothing. Management and personnel responsibilities of buyers. Field trips to representative stores. Prerequisite: CT 350; senior standing.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

CT 501. Research.

CT 503. Thesis.

CT 505. Reading and Conference.

CT 506. Projects.

CT 507. Seminar.

CT 508. Workshop.
Terms and hours to be arranged.

CT 512. Comparative Tailoring.
4 hours. 2 ① 2 ③
A comparison of tailoring methods used in custom-made garments; application of selected methods in construction of a tailored garment. Prerequisite: CT 312.

CT 513. Readings in Clothing, Textiles, and Related Arts.
3 hours. 3 ①
Review, interpretation, and significance of research studies.

CT 514. Research Methods in Clothing, Textiles, and Related Arts.
3 hours. 3 ①
Philosophy and methodology for research. Prerequisite: 3 hours of statistics.

CT 515. Clothing and Human Behavior.
3 hours. 3 ①
Application of theories from the social sciences to clothing selection and use. Prerequisite: 12 hours of psychology, sociology, and/or cultural anthropology.

CT 520. Selected Topics in Clothing, Textiles, and Related Arts.
3 hours. 3 ①
Topics of current importance. May be repeated for credit.

CT 552. Textile Analysis.
4 hours. 1 ① 2 ③
Identification of textile fibers by chemical methods and quantitative analysis for moisture content, total nonfibrous materials, fiber content. Prerequisite: CT 451.

FAMILY LIFE

The Department of Family Life offers courses in the areas of marriage, family relationships, and child development. Advanced courses prepare students for work in preschool education programs, social service agencies and youth agencies, and graduate work leading to research and college teaching. Two child development laboratories on campus are used for instruction. Men and women in any school are welcome in courses for which they have the prerequisites.

Lower Division Courses

FL 199. Special Studies.
Terms and hours to be arranged.

FL 222. Marriage Preparation.
2 hours. 2 ①
Courtship period, factors in mate selection.

FL 223. Family Living. 2 hours. 2 ①
Marriage and relationships in the beginning family.

FL 225. Child Development.
3 hours. 3 ① 1 ①
The infant and young child; observations in child development laboratory.

FL 240. Contemporary American Families. 3 hours. 3 ①
The family as an influence in the socialization and general development of individuals; contemporary family practices, styles, and issues as developmental forces.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

FL 311. Child Development.
3 hours. 3 ① 1 ①
Behavior and development of preschool children. Observation in a child development laboratory. Prerequisite: Psy 200; FL 225.

FL 312. Studies in Child Development.
3 hours. 3 ①
Theory and basic research in the area of child development. Prerequisite: FL 311.

FL 322. Family Relationships.
3 hours. 3 ①
Stages and adjustments in the family cycle; the family and the community. Prerequisite: FL 240; Soc 204; junior standing.

FL 401. Research.

FL 403. Thesis.

FL 405. Reading and Conference.

FL 406. Projects.

FL 407. Seminar.

FL 408. Workshop.
Terms and hours to be arranged.

FL 413. Development in Middle Childhood and Adolescence. (G)
3 hours. 3 ①
Growth and development in middle and late childhood and early adolescence. Prerequisite: FL 311.

FL 421. Behavior of Young Children.
2 hours. 2 ①
For men. Understanding development problems of young children; observations in a child development laboratory. Prerequisite: senior standing or consent of instructor.

FL 423. Parent Education. (G)
3 hours. 1 ① 1 ②
Relationships of parents and children: resources for meeting problems with emphasis on discussion as a method. Prerequisite: FL 425.

FL 425 Directed Experience with Preschool Children. (g)
3 hours 2 ① 1 ④
Developing insight into child behavior and child-adult relations through participation in the preschool education program. Prerequisite: FL 311; preregistration one term in advance.

FL 426. Preschool Child Laboratory.
(G) 2 hours. 1 ⑤
May only be taken parallel to FL 425 or FL 427. It may parallel both; preregistration one term in advance.

FL 427. Educational Programs for Preschool Children.
(G) 5 hours. 2 ① 1 ⑤
Program planning for preschool children, home-school relations, studies of individual children. Field trips; parent meetings required. Prerequisite: FL 425; consent of Director of Child Development Laboratories one term in advance.

FL 428. Curriculum Enrichment for Young Children. (g)
4 hours. 4 ①
Relating literature, art, music, and science activities to child interests; projects for preschool programs. Prerequisite or parallel: FL 425.

FL 429. Supervised Nursery School Experience. (g) 9-12 hours.
Full participation in a preschool education program and its administration; field experiences arranged. Consent of Director of Child Development Laboratories required. Prerequisite: FL 425.

FL 430. Understanding Child Behavior. (G) 3 hours. 3 ①
Observation of young children as a basis for developing insight into human behavior. Prerequisite: FL 425.

FL 435. Organization and Administration in Preschools. (G)
3 hours. 1 ② 1 ①
Organization and administration of school for young children with special emphasis upon the application of research findings to details of good preschool programs. Prerequisite: FL 425 or equivalent and consent of instructor.

FL 481. Selected Topics in Family Relationships. (G)
3 hours, maximum 6 hours. 3 ①
Current literature, research, and theories on family relations. Prerequisite: FL 322. May be repeated for credit.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

FL 501. Research.

FL 503. Thesis.

FL 505. Reading and Conference.

FL 506. Projects.
Terms and hours to be arranged.

FL 507. Seminar.
Terms and hours to be arranged.
TEACHING CHILD DEVELOPMENT.
TEACHING FAMILY RELATIONS.

FL 508. Workshop.
Terms and hours to be arranged.

FL 511,512. Methods of Behavioral Research.
3 hours. 3 ①
Philosophy and methods of behavioral research with emphasis on application of concepts to problems in Child Development and Family Relations.

FL 520. Nursery School Philosophy.
3 hours. 3 ①
Philosophy underlying procedures in nursery education; role of nursery school teacher. Prerequisite: FL 425 or equivalent and consent of instructor.

FL 523. Topics in Preschool Education.
3 hours. 3 ①
Review of research studies with emphasis on significance and interpretation.

FL 530,531,532. Behavior in Infancy and Early Childhood.
3 hours each term. 3 ①
FL 530: Significance of prenatal and perinatal factors in development of behavior; interrelationships of various developmental sequences throughout infancy. *FL 531:* Socialization process, child behavior, and learning during the early childhood years. *FL 532:* Measurement and evaluation of social, emotional, intellectual, and physical development through the preschool years.

FL 533. **Topics in Child Development.**
3 hours. 3 ①
Research studies reviewed; focus on interpretation. Significance and integration with theory.

FL 534. **Child Development Theories.**
3 hours. 2 (1½)
Critical evaluation of child development theories which allows the student to develop a theoretical framework for understanding child behavior. Prerequisite: FL 530.

FL 541. **Family Theories.**
3 hours. 2 (1½)
Investigation and comparison of major theoretical frameworks used in family analysis and research. Prerequisite: FL 481.

FL 543. **Topics in Family Relations.**
3 hours. 3 ①
Research studies reviewed; focus on interpretation. Significance and integration with theory.

FOODS AND NUTRITION

The Foods and Nutrition Department offers basic courses in nutrition, in the application of scientific principles to the preparation of foods, and in meal management. Advanced and specialized upper division courses are offered for students with specific professional interests. The General Foods and Nutrition option is offered for students with professional interests in food product development and promotion, adult education, and graduate study. Options in Clinical and Therapeutic Dietetics and in Community Nutrition meet the academic requirements for a specialized internship and membership in the American Dietetic Association. Students in any School may take any course in foods and nutrition for which they have the prerequisites.

Graduate courses are available for programs leading to the Master of Science, Master of Arts, and the Doctor of Philosophy degrees for those students interested in high school or college teaching, research, or other professional opportunities with an advanced degree in foods and nutrition.

Lower Division Courses

FN 199. **Special Studies.**
Terms and hours to be arranged.

[1]FN 215. **Foods.**
5 hours. 3 ① 2 ③
Components of foods: their functional properties and interactions in food preparation. Prerequisite: FN 225; one year of physical or biological science.

[1]FN 218. **Food Preparation.**
3 hours. 1 ① 2 ②
Basic principles of food preparation, meal planning, and service.

[1]FN 220,221. **Foods.**
4 hours each term. 2 ① 2 ②
Chemical and physical principles applied to the study of foods. Prerequisite: FN 225. Prerequisite or parallel: Ch 226,227.

[1] Credit granted for only one of the following: FN 215, 218, 220-221.

FN 225. **Nutrition.**
4 hours. 3 ① 1 ①
The relationship of food and its components to health with emphasis on the young adult. Current national and international concerns considered.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

FN 313. **Meal Management.**
3 hours. 2 ① 1 ③
Principles of foods and nutrition applied to meal planning, preparation, and service; economic, aesthetic, nutritional, and managerial aspects. Prerequisite: FN 215, 218, or 221; FN 225.

FN 325. **Family Nutrition.**
3 hours. 3 ①
Principles; maternal nutrition, nutrition of the infant and child through growth period; geriatric nutrition. Prerequisite: FN 225.

FN 335. **Science of Foods.**
3 hours spring. 3 ①
Structure of foods; chemical nature and physical changes in components. Prerequisite: Ch 107 or 207; FN 215.

FN 401. **Research.**

FN 403. **Thesis.**

FN 405. **Reading and Conference.**

FN 406. **Projects.**

FN 407. **Seminar.**

FN 408. **Workshop.**
Terms and hours to be arranged.

FN 410. **Food Demonstrations.**
3 hours. 1 ① 1 ② 1 ③
Principles and techniques of communication with emphasis on classroom, extension, and commercial demonstration. Prerequisite: FN 313; Sp 111 or Ed 416, or equivalent.

FN 411. **Family Food Buying.** (g)
3 hours. 1 ① 1 ② 1 ③
Principles of economics applied to buying food for the home; laws protecting the consumer, criteria for selection of food at different income levels. Prerequisite: FN 313; Ec 115,215, or 213.

FN 414. **Home Food Preservation.**
(g) 3 hours. 1 ① 1 ② 1 ③
Principles and methods, including freezing, canning, curing, pickling, and preserving with sugar. Prerequisite: FN 215 or 221; Mb 130 or 304. Offered alternate years. Offered 1974-75.

FN 415. **Food Economics.** (G)
3 hours. 3 ①
Economic principles applied to the consumption of food and the provision of adequate nutrition; consideration of production and marketing aspects. Prerequisite: sequence in principles of economics; one course in nutrition.

FN 416. **Cultural Aspects of Foods.**
(g) 3 hours fall. 2 ① 1 ③
Regional, ethnic, and religious influences on food patterns. Laboratory experience with food from several cultures. Prerequisite: FN 313 or consent of instructor.

FN 417. **Nutrition.** (g)
3 hours fall. 3 ①
Fundamentals; application of biochemistry and physiology to nutrition of the individual and family. Prerequisite: biochemistry; physiology; one course in nutrition. FN 418,419 required to complete sequence.

FN 418. **Nutrition Laboratory.** (g)
1 hour fall. 1 ②
Taken concurrently with FN 417.

FN 419. **Nutrition.**
3 hours winter. 3 ①
Continuation of FN 417 which is prerequisite.

FN 420. **Nutrition in Disease.** (G)
3 hours spring. 2 ① 1 ②
Adjustment of the normal diet to meet the demands imposed by disease. Prerequisite: FN 419.

FN 421. **Child Nutrition.** (G)
3 hours. 3 ①
Nutritional needs from prenatal life through childhood: maternal dietary requirements. Prerequisite: FN 419.

FN 425 **Advanced Foods.** (G)
4 hours. 3 ① 1 ②
Polysaccharides, lipids, and proteins: structures and functional properties in foods. Prerequisite: FN 221 or 335; Ch 228, 229.

FN 435. **Experimental Food Studies.**
(G) 5 hours winter. 2 ① 1 ① 2 ②
Subjective and objective evaluation techniques applied to individual studies using the experimental approach. Prerequisite: FN 221 or 335; Ch 228, 229.

Graduate Courses

See also courses marked (g) and (G) above.

FN 501. **Research.**

FN 503. **Thesis.**

FN 505. **Reading and Conference.**

FN 507. **Seminar.**

FN 508. **Workshop.**
Terms and hours to be arranged.

FN 521. **Readings in Nutrition.**
3 hours fall. 3 ①
Research studies reviewed; interpretations and significance. Prerequisite: FN 417.

FN 522. **Research Techniques.**
4 hours. 1 ① 2 ③
Methods and techniques for the analysis of nutrients and metabolites in foods and other biological materials, including blood studies. Prerequisite: FN 417; Ch 234.

FN 523. **Techniques in Nutrition Research.**
3 hours. 2 ③
Assessment of nutritional status in humans; balance studies; special problems in determination of nutrients and metabolites. Prerequisite: FN 522.

FN 531 **Techniques in Foods Research.**
3 hours. 2 ③
Study of the physical aspects of food quality. Prerequisite: FN 425,435,522.

FN 532. **Advanced Foods.**
3 hours. 3 ①
Components and organization of plant and animal tissues as related to properties of foods; color and flavor components included. Prerequisite: FN 425; biochemistry.

FN 535. **Selected Topics in Foods.**
3 hours. 3 ①
Prerequisite: Ch 228,229; FN 425 or FN 435. Offered alternate years. Offered 1974-75.

FN 551. **Selected Topics in Nutrition.**
3 hours. 3 ①
Prerequisite: FN 521. Offered alternate years. Not offered 1974-75.

[2]FN 590T. **Principles of Foods for Teachers.**
3 hours summer. 2 ① 1 ③
Chemical, physical, and structural properties of food materials as they relate to the characteristics of the finished product. For teachers in secondary schools and Extension. Prerequisite: general chemistry, nutrition, foods, and meal management.

[2]FN 591T. **Principles of Nutrition for Teachers.**
3 hours summer. 3 ①
Principles and recent developments in nutrition and their applications. For teachers in secondary schools and Extension. Prerequisite: general chemistry; physiology; FN 325.

HOME ECONOMICS EDUCATION

Professional preparation for teachers of home economics is provided by the Department of Home Economics Education. A student in either the School of Home Economics or the School of Education may meet certification requirements. Before registering for teacher preparation courses, every student should receive permission for registering and guidance for selection of courses from the home economics education staff. Home economics students who have taken FL 225 and FL 311 may take FL 413 to substitute for Ed 460. (For requirements for the State Teachers' Certificates and listing of courses see SCHOOL OF EDUCATION.)

HOME ECONOMICS EXTENSION

Professional preparation for the position of Cooperative Extension Service Home Economist is offered by the School of Home Economics. Courses taught by staff members of the Cooperative Extension Service include classroom work in methods used by Extension to disseminate information, as well as practical experience with a county extension staff. For full description of courses see EXTENSION METHODS, School of Agriculture.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

EM 405. **Reading and Conference.**
Terms and hours to be arranged.

EM 411,412. **Extension Methods.** (G)
3 hours each, winter and spring 3 ①

EM 453. **Field Work in Extension.**
(g) Terms and hours to be arranged.

[2] Course may not be counted as part of the requirement for a graduate major in foods and nutrition.

Graduate Courses

EM 505. **Reading and Conference.**

EM 508. **Workshop.**
Terms and hours to be arranged.

HOME ECONOMICS (GENERAL)

Lower Division Course

HEc 101. **Orientation to Home Economics.** 1 hour fall. 2 ①

HEc 199. **Special Studies.**
Terms and hours to be arranged.

Upper Division Courses

HEc 407. **Seminar.**

HEc 408. **Workshop.**
Terms and hours to be arranged.

HEc 410. **Home Economists in Society.**
1 hour. 1 ①
Perspectives on the development of home economics and current roles of home economists in society. Prerequisite: senior standing.

Graduate Courses

HEc 507. **Seminar.**
HEc 508. **Workshop.**
Terms and hours to be arranged.

HOME MANAGEMENT

The Department of Home Management offers instruction in the areas of family economics, home management, housing, and household equipment. Advanced courses are offered in the first three of these areas, leading to advanced degrees and positions in industry, social work, research, and college teaching. Laboratories for instruction include a home management house on campus and a housing and equipment laboratory in the Home Economics Building.

Courses are open to students in other Schools.

Lower Division Courses

HM 199. **Special Studies.**
Terms and hours to be arranged.

HM 235. **Family Housing and Its Environment.**
3 hours. 3 ①
Consideration of aesthetic, economic, and psychological factors affecting family needs in housing and its environment.

HM 250. **Decision-Making and the Consumer.**
3 hours. 3 ①
Concepts associated with home management in various situations to include: values, goals, standards, decision-making, management processes, uses of human and material resources to meet individual and family needs.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

HM 330. **Household Equipment.**
3 hours. 2 ②
Selection, placement, use, and care of major and small kitchen, laundry, and cleaning equipment.

HM 335. **Organization and Use of House Space.** 3 hours. 2 ① 1 ②
Housing needs of families; optimum dimensions of activity areas; patterns for space units of family dwelling; evaluation of house plans and family needs. Prerequisite: AA 178.

HM 341. **Personal and Family Finance.**
3 hours. 3 ①
Open to men and women. Management of income, expenditures, credit, savings, insurance, Social Security, taxes, etc.

HM 401. **Research.**

HM 403. **Thesis.**

HM 405. **Reading and Conference.**

HM 406. **Projects.**

HM 407. **Seminar.**

HM 408. **Workshop.**
Terms and hours to be arranged.

HM 412. **Consumer Economics.** (g)
3 hours. 3 ①
The consumer in the market place; basis for choice-making; consumption patterns and trends in U. S.; consumer information and protection. Prerequisite: HM 341; Ec 213.

HM 435. **House Planning in Relation to Function.** (G) 3 hours. 2 ① 1 ②
A case study approach to housing situations in relation to functional needs; a study of dwellings and their environment. Prerequisite: HM 335.

HM 436. **Functional Design of Dwellings.** (G)
Terms and hours to be arranged.
Storage space; arrangement of equipment; floor plans for small dwellings. Prerequisite: HM 435.

HM 439. **Family Housing.** (G)
3 hours. 3 ①
Socio-economic aspects of housing in relation to family living. Prerequisite: economics; Soc 204; senior or graduate standing.

HM 440. **Management in Family Living.** (G) 3 hours. 3 ①
Theories and principles of home management; evaluation of related research. Prerequisite: HM 250,341; Psy 202; sociology.

HM 441. **Economics of the Family.**
(G) 3 hours. 3 ①
The family and roles of its members in American economy; problems of setting, improving, and maintaining standards of living. Prerequisite: HM 250,341; Ec 213,214.

HM 445. **Community Services and Welfare of Families.** (G)
3 hours. 3 ①
Impact of businesses, agencies, and informal associations in society on family well-being. Prerequisite: HM 250; Soc 204.

HM 450. **Home Management House.**
4 hours. 3 ① and residence
Applying principles of management and decision making courses in a group and in family-type housing. One-half term residence. Prerequisite: FN 313; HM 250.

HM 460. **Management in the Home.**
4 hours. 2 ① 1 ②
Supervised management and decision making experience with student's home used as laboratory. Open to married students only. Students who are married and living at home may substitute HM 460 for HM 450. Prerequisite: HM 250, FN 313.

Graduate Courses
See also courses marked (g) and (G) above.

HM 501. **Research.**

HM 503. **Thesis.**

HM 505. **Reading and Conference.**
Terms and hours to be arranged.

HM 506. **Projects.**
Terms and hours to be arranged.

HM 507. **Seminar.**
Terms and hours to be arranged.

HM 508. **Workshop.**
Terms and hours to be arranged.

HM 510. **Philosophy and Application of Home Management.**
3 hours. 3 ①
Current home management philosophy and its use in analyzing managerial problems facing homemakers today. Prerequisite: HM 440.

HM 540,541,542. **Selected Topics in Home Management.**
3 hours each term. 3 ①
Consent of instructor required.

INSTITUTION MANAGEMENT

The curriculum in institution management and dietetics provides preparation for professional positions as dietitians or food service managers in organizations such as schools, colleges, hospitals, restaurants, and other organizations which serve food. The Institution Management Department utilizes large group feeding and housing facilities on campus for laboratory experience.

Business majors interested in food service management or gerontological institution administration may take a minor in this department.

Men and women majoring in dietetics and institution management are encouraged to qualify for a post-graduate dietetic internship to fulfill membership requirements in the American Dietetic Association.

Graduate courses and programs are available to those seeking a Master of Science degree in administrative dietetics or institution management.

Lower Division Courses

IM 199. **Special Studies.**
Terms and hours to be arranged.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

IM 311. **Quantity Food Production.**
4 hours. 2 ① 2 ③
Quantity food production methods; standardized formulae and costing; equipment; menu planning; safety and sanitation. Prerequisite: FN 313.

IM 401. **Research.**

IM 403. **Thesis.**

IM 405. **Reading and Conference.**

IM 406. **Projects.**

IM 407. **Seminar.**

IM 408 **Workshop.**
Terms and hours to be arranged.

IM 410. **Food Service Systems: Organization and Operations** (g)
3 hours. 2 ① 1 ① 1 ②
For teachers in vocational food service programs and managers of food service departments. Not open to institution management majors. Prerequisite: FN 313 or a course in management.

IM 440. **Purchasing for Institutions.**
(g) 5 hours winter. 5 ①
Selection, design, and materials, cost and arrangement of equipment; sources, standards of quality, grades, methods of purchase, care and storage of food. Prerequisite: IM 311.

IM 445. **Organization and Management of Food Services.** (g)
5 hours. 3 ① 1 ① 1 ⑤
Philosophy and functions of management applied to food service organizations; utilization of resources: personnel, space and equipment, time and money; evaluation of food systems. Prerequisite: IM 311; 440. (Five-hour lab to be arranged.)

IM 450. **Institution Experience.**
(G) 4 hours. 1 ① 3 ②
Experience in campus food units includes food production and service, business office procedure, catering, and banquet service management. Prerequisite: IM 311,440.

Graduate Courses
See also courses marked (g) and (G) above.

IM 501. **Research.**

IM 503. **Thesis.**

IM 505. **Reading and Conference.**

IM 506. **Projects.**

IM 507. **Seminar.**

IM 508. **Workshop.**
Terms and hours to be arranged.

IM 520. **Advanced Food Service Management.**
3 hours winter. 3 ①
Interpretation of management principles and current research in relation to administration of food service organizations at the policy-making level. Prerequisite: IM 440,445.

OCEANOGRAPHY

FACULTY

As of January 1974

JOHN V. BYRNE, Ph.D., Dean, School of Oceanography

PROFESSORS Bodvarsson, Burt, Curl, Frolander, Hedgpeth, Morita, Nath, Park, Pearcy, Pytkowicz, van Andel

ASSOCIATE PROFESSORS Allen, Caldwell, Carey, Couch, Dymond, Heath, Kulm, McCauley, Moore, Neshyba, Rittenhouse, Small, Smith

ASSISTANT PROFESSORS Blakely, Corliss, Gonor, Gordon, Heinrichs, R. Johnson, S. Johnson, Komar, Mesecar, Miller, Neal, Panshin, Paulson, Renfro, Strong

INSTRUCTORS Condon, Hancock, Redmond

RESEARCH ASSOCIATES Barton, Crew, Culberson, Cutshall, Elliott, Hogan, Holton, Ingle, D. Johnson, Kundu, Pak, Pillsbury, Quinn, Richardson, deSzoeke, Zaneveld

THE SCHOOL OF OCEANOGRAPHY, established in 1972, has a short but impressive history of growth and development at Oregon State University. Since its inception in 1959 as a department with one specialist, it has grown to include a staff of 50 scientists, more than 100 support personnel, and an equal number of graduate students.

Very little was known before 1959 about Oregon's coastal or estuarine areas, their animals and plants, or the earth beneath them. Since that time, major research effort has been directed to the Pacific Ocean area off the Oregon coast. In recent years, the territory of interest has widened to include all the oceans of the world.

Mission

The School has a three-fold mission: To prepare young men and women for careers in oceanography and related fields; to broaden, through research and extension, regional knowledge about the marine environment; to further national oceanic endeavors.

Teaching and Research

Teaching and research programs emphasize the interdependence of the biological, chemical, geological, geophysical, and physical processes in the sea. In the School each of these disciplines is represented by a number of scientists. This interdisciplinary approach encourages and makes possible the rapid exchange of ideas often necessary for the solution of a research problem. Graduate students play an essential part in carrying out such research.

Job Opportunities

The School helps students prepare for (1) research and teaching positions with colleges and universities; (2) civil service positions with federal or state governments; (3) research and technical positions at oceanographic laboratories; (4) research and instrument development with industry; (5) applied research related to other areas of study, such as fisheries, geology, meteorology, or engineering; and (6) managerial positions dealing with pollution, resources, and environment.

Branches of the federal government that employ oceanographers include the Navy, the Coast Guard, the Department of Interior, the U.S. Geological Survey, the National Oceanographic and Atmospheric Administration, the Atomic Energy Commission, the National Marine Fisheries Service, the Army Corps of Engineers, and the Environmental Protection Agency.

Although the main United States oceanographic effort still centers around federal programs or federally supported programs, the number and variety of companies needing oceanographers is expected to increase slowly. The efforts of most colleges and universities go into both teaching and research. Research at the university level is generally supported by federal grants to schools near the coasts and on the Great Lakes. However, some research may be carried out at inland universities. Many of the inland schools now offer oceanography courses. Elementary and secondary schools throughout the country are now offering courses involving oceanography. The demand for qualified teachers may put more pressure on inland colleges and universities to offer some courses for teachers.

Admission Requirements

Only graduate degrees are offered in Oceanography. Requirements for admission to graduate study are:

1. A bachelor's degree with a major (40 term hours or more) in a basic science (such as physics, mathematics, chemistry, biology, or geology) or engineering.
2. A cumulative grade-point average of approximately 3.00 on a 4.00 scale.
3. One year of undergraduate coursework in physics, chemistry, and calculus.
4. Graduate record examination (GRE) scores (general and advanced).

A student applying as a candidate for a doctor's degree is usually expected to hold a master's degree in addition to the above prerequisites. In exceptional cases, a student, with the permission of his adviser, may apply to advance directly to the Ph.D. after completing one year of coursework at Oregon State University. Such applications are evaluated by the Student Evaluation Committee of the School of Oceanography.

Master of Science Program

The University requires a minimum of 45 hours of coursework for the master's program, including thesis. Approximately two-thirds of the work is in the major field. Oceanography majors normally include 6 hours for the thesis in their programs. In special cases the thesis requirement may be waived at the discretion of the dean. Oceanography majors usually minor in some other field of science, or in mathematics, statistics, or engineering. A final oral examination is required upon completion of the thesis and coursework.

The core course requirements consist of one course in biological oceanography, one course in chemical oceanography, one course in geological oceanography, and two courses in descriptive physical oceanography.

For specific university requirements for advanced degrees see GRADUATE SCHOOL. Courses completed under a master's program usually can be transferred into the Ph.D. program.

Doctor of Philosophy Program

The Ph.D. program is determined by the individual student and his committee (see GRADUATE SCHOOL for specific university requirements). Approximately 80 hours of oceanography courses (including the core courses and 30 to 35 hours of thesis) are usually included in the program, and a first and second minor or an integrated minor totaling 40 to 50 hours is common. There are no set requirements on the number of course hours to be taken; each program is set to correspond to the needs of the individual candidate. A student must satisfy the foreign language requirements established by his committee. The dissertation is based on an original investigation in some area of oceanography.

Some graduate credits earned at other institutions may be accepted in the major and minor.

Geophysics Program

Programs in geophysics and marine geophysics have been developed within the School with the cooperation of the Departments of Physics, Geology, and Mathematics. A student studying for a degree under this program works out with his committee a course of study which must include a minimum of three courses in oceanography. The remainder of the program will be selected from geophysics courses or from related fields.

Minor Programs

M.S. candidates who wish to minor in oceanography must take one course in descriptive physical oceanography and from 8 to 15 hours of other oceanography courses.

Ph.D. candidates who wish to minor in oceanography must take the five core courses. If oceanography is the first minor, the program should include a total of approximately 30 hours of oceanography.

Summer Programs

Summer courses are offered at the Marine Science Center in Newport as well as on the main campus in Corvallis. At the Marine Science Center, individual research is offered each summer while marine-oriented workshops and courses vary from year to year. For further information on summer programs at the coast write to: Dr. Joel W. Hedgpeth, Marine Science Center, Newport, Oregon 97365.

Courses offered on the Corvallis campus each summer are normally graduate-level courses for nonmajors, such as high school teachers. Distinguished visiting oceanographers frequently offer short courses or seminars which are usually open to majors and nonmajors. For further information on summer programs write to the Director of Summer Term, Oregon State University.

Extension

Extension work, by which interpreted information is transferred to marine users and by which their problems in turn are communicated to researchers, is one of the important functions of the School of Oceanography. Through a variety of means, the oceanography extension program seeks to serve as a link between people who use the ocean and those who study and manage it. Projects have emphasized work with commercial fisheries, coastal zone management, marine recreation, maritime transportation, and with the general public. Present efforts are conducted through the Marine Advisory Program of the Extension Service, which is an interdisciplinary, systems approach funded by the National Sea Grant Program.

Time at Sea

Students majoring in oceanography or marine geophysics are required to participate in work at sea for a minimum of eight days during their graduate career. Students are expected to participate actively in the sea-going program of their major field. Most students easily exceed the minimum requirement and can anticipate several weeks of sea-time per year in the course of their work. Student sea-time is scheduled by the major professor and student.

Research Vessels

The School operates a fleet of research vessels based at the Marine Science Center in Newport, Oregon, 50 miles from the Corvallis campus. The major ship is *R/V Yaquina*, a general purpose 180-foot deep-sea oceanographic research vessel equipped to carry out all types of marine research. Although usually at sea for periods up to 21 days, *Yaquina* has logged more than 42,000 miles during one 9-month cruise off the west coast of Central and South America.

The 80-foot *R/V Cayuse* is used mainly for coastal research in waters over the continental shelf and slope. *Cayuse* has operated in coastal waters from Alaska to Mexico.

Small vessels are also maintained for nearshore and estuarine research.

Courses in Oceanography

Upper Divison Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Oc 331 Introduction to Oceanography
3 hours 3 ①
Elective nontechnical course designed to give student broad general background. Emphasis on relationship between oceanography and other fields. Prerequisite: junior standing.

Oc 405 Reading and Conference (g)

Oc 406 Projects (g)

Oc 407 Seminar (g)

Oc 408 Workshop (g)
Terms and hours to be arranged

Oc 442 Marine Zooplankton (G)
3 hours 3 ①
Small animal life in the sea, population and production, regional distribution, physiology, sampling. Prerequisite: two years of biology or Oc 490 or Oc 541.

Oc 443 Marine Zooplankton Laboratory (G)
2 hours 2 ⑧
Oc 442 to be taken concurrently.

Mb 450
Marine Microbiology (G)
3 hours 3 ①
See MICROBIOLOGY.

Oc 471 Physical Limnology (g)
3 hours 3 ①
Geological and physical processes in lakes, rivers, and reservoirs; procedures for field studies in physical limnology. Prerequisite: Mth 51; 18 hours of science.

Oc 490
Principles of Biological Oceanography
(g) 3 hours 3 ①
The ocean as a living environment: importance of temperature, salinity, density, circulation, light, nutrients and dissolved gases to life in the sea; adaptations of organisms living in the ocean; productivity; food web; ocean pollution problems. Not for oceanography majors. Prerequsite: 8 hours of upper division science. Offered alternate years.

Oc 491
Principles of Physical Oceanography (g)
3 hours 3 ①
Physical properties of seawater, interrelationships between atmosphere and ocean, heat budget, water mass formation, ocean circulation, waves, tides, coastal and estuarine processes. Not for oceanography majors. Prerequisite: Mth 51; Ph 112 or GS 106 or permission of instructor. Offered alternate years.

Oc 492
Principles of Geological Oceanography
(g) 3 hours 3 ①
Sedimentation processes, geological features of the oceans and continental margins, minerals found in or on the sea floor, sea floor spreading, present day research. Not for oceanography majors. Prerequisite: 8 hours of upper division science. Offered alternate years.

Oc 493
Principles of Chemical Oceanography
(g) 3 hours 3 ①
Chemical composition of seawater; methods of analysis; chemistry of solutions; salinity, pH, dissolved gases, nutrients and other factors important to man; pollution problems; extraction of materials useful to man. Not for oceanography majors. Prerequisite: Mth 51 and one year of chemistry or consent of instructor. Offered alternate years.

Oc 499
Special Topics in Oceanography (G)
1, 2, 3, 4, or 5 hours
1 ① 2 ① 3 ① 4 ① or 5 ①

Graduate Courses
See also courses marked (g) and (G) above.

Oc 506 Projects
Terms and hours to be arranged

Oc 508 Workshop
Terms and hours to be arranged

Oc 511
Littoral Processes and Sedimentation
3 hours 3 ①
Nearshore environmental processes including an examination of real waves (wave theories and their application, refraction, diffraction, reflection, and breaking); generation of longshore and rip currents, mechanics of sediment transport on beaches, and features of recent sediments. Prerequisite: general physics; integral and differential calculus.

Oc 521 Marine Radioecology
3 hours 3 ①
Artificial radionuclides in the marine environment, their measurement, identification; their uptake and transference through marine food chains. Prerequisite: GS 441.

Oc 529
Special Topics in Marine Radioecology
1 2 or 3 hours 1 ① 2 ① or 3 ①

Oc 531
Descriptive Physical Oceanography I
4 hours 3 ① 1 ②
Physical properties of seawater; air-sea interaction; light transmission; heat, water, and salt budgets and water mass formation; distribution of temperature, salinity, and density; sound transmission; surface circulation; deep circulation and mixing processes. Prerequisite: one year of college physics; differential and integral calculus.

Oc 532
Descriptive Physical Oceanography II
4 hours 3 ① 1 ②
Water masses as related to circulation; mixing and upwelling; regional physical oceanography; wind wave generation and forecasting; internal waves; tsunamis; tides and tidal currents; seiches; storm surges; wave refraction and shoaling; longshore currents; physical oceanography of estuaries and the nearshore region; changes in estuaries and coastal areas caused by man. Prerequisite: Oc 531; one year of college physics; differential and integral calculus.

Oc 541
Biological Oceanography (G)
4 hours 3 ① 1 ③
The ocean as an ecosystem; interaction of the physical, chemical and biological factors; plant and animal populations; methods of sampling, identification and analysis. Prerequisite: Oc 531, Oc 551.

Oc 542 Marine Nekton
3 hours 3 ①
Squid, fishes, and marine mammals; vertical and horizontal distribution; migrations; physical, chemical, and biological factors affecting distribution and abundance; foodchain relationships; special problems of deep-sea life; methods of sampling. Prerequisite: Oc 490 or Oc 541 or equivalent.

Oc 543 Marine Nekton Laboratory
1 hour 1 ③
Oc 542 to be taken concurrently.

Oc 544 Marine Phytoplankton Ecology
3 hours 3 ①
Floating plant life in the sea and estuaries; systematics and distribution; physiology; population dynamics; environmental factors; artificial cultivation; effect upon environment and position in food webs. Prerequisite: Oc 331 or Oc 490 or Oc 541 or two years of biology.

Oc 545
Marine Phytoplankton Physiology
3 hours 3 ①
Life processes of plankton algae: energy-capturing processes, mineral nutrition, flotation mechanisms, cell division. Evaluation of experimental procedures; problems of existence in the open ocean; artificial production of maximum yields. Prerequisite: Oc 544.

Oc 546 Marine Primary Production
5 hours 3 ① 2 ③
Experimental procedures for measuring primary biological production. Evaluation of experimental results and their interpretation. Consent of instructor required. Prerequisite: Oc 545.

Oc 548 Marine Benthic Ecology
4 hours 3 ① 1 ③
Ecology of the marine bottom environment; marine and estuarine bottom communities; effects of the environment on distribution and abundance of fauna; adadptations to the environment; population dynamics. Prerequisite: Z 451,452.

Oc 549 Special Topics in Biological Oceanography
1 2 or 3 hours 1 ① 2 ① or 3 ①

Oc 551 Chemical Oceanography
4 hours 3 ① 1 ③
Chemistry of the oceans; their chemical nature; the chemical processes which take place within them and between them and the biosphere, lithosphere, and atmosphere. Chemistry of marine pollution. Chemical analysis of seawater. Not for chemistry majors. Prerequisite: Ch 203 or 205; Oc 531.

Oc 552 Chemical Oceanography
4 hours 3 ① 1 ③
Chemistry of the oceans for chemists. Sea water as a complex electrolyte solution. The nature and rates of chemical reactions occurring in sea water and between the oceans and the biosphere, lithosphere, and atmosphere. Chemical models of seawater and the oceans. Chemistry of marine pollution. Selected chemical methods for seawater analysis. Prerequisite: undergraduate degree in chemistry.

Oc 553
Descriptive Chemical Oceanography
4 hours 4 ①
Reasons for observed distributions and cycles of chemical species in seawater. Applications of these distributions to the study of water masses, exchange with the atmosphere, biological production, and sedimentation. Prerequisite: Oc 451 or Oc 552.

Oc 554
Theoretical Chemical Oceanography
4 hours fall 4 ①
Thermodynamics of chemical reactions in seawater at atmospheric and at high pressures, illustrated mainly by the carbon dioxide-carbonate system. Physico-chemical properties of seawater. Prerequisite: one year of physical chemistry.

Oc 559 Special Topics in Chemical Oceanography
1 2 or 3 hours 1 ① 2 ① or 3 ①

Oc 560 Geological Oceanography
4 hours 3 ① 1 ②
Structure of ocean basins, plate tectonics and sea floor spreading, marine sedimentation, history of ocean basins, and analysis of geological and geophysical data. Prerequisite: one year of physics and chemistry or science background.

Oc 561 Geology and Geophysics of the Ocean Basins I
3 hours 3 ①
Physiography of the ocean floor, geophysics of oceans and continents, dynamics of the upper mantle, principles of global tectonics. Prerequisite: one year each of physics, calculus, and geology. Required for majors in geological oceanography.

Oc 562 Geology and Geophysics of the Ocean Basins II
3 hours 3 ①
Petrology of the oceanic crust and upper mantle; tectonic features of the ocean floor and their dynamic function; structure and sedimentation of the continental margins. Prerequisite: Oc 561 or consent of instructor. Required for majors in geological oceanography.

Oc 563 Deep-Sea Sediments
3 hours 3 ①
Nature and distribution of deep-sea deposits; factors controlling the distribution of terrigenous, volcanic, biogenic and authigenic components; diagenesis and redistributon at the ocean floor; ancient deep-sea sediments.

Oc 564
Mineralogy of Marine Sediments
3 hours 2 ① 1 ③
Identification and quantitative determination of fine-grained minerals in marine, especially deep-sea, sediments; structural characteristics and genesis of important mineral groups; application of laboratory techniques, particularly X-ray diffraction, to specialized research problems.

Oc 565
Stratigraphy of Marine Sediments
3 hours 3 ①
History of ocean basins as revealed by sedimentary deposits; interpretation of paleontological, geological, and geophysical data and uses of these data in stratigraphic correlations. Prerequisite: Oc 561,563. Offered alternate years.

Oc 566 Ecology of Foraminifera
3 hours 3 ①
Morphology and physiology; physical, chemical, and biological controls on the distribution and abundance of benthic and planktonic foraminifera; gross population trends; seasonal variations in faunas; applications to other fields. Prerequisite: Oc 441 or G 540 or two years of hiology. Offered alternate years.

Oc 567 Marine Micropaleontology I: Foraminifera
4 hours 2 ① 2 ③
Systematics and taxonomy; laboratory identification and classification; field and laboratory techniques, use of literature; numerical analysis of faunas; familiarization with bathymetric and zoogeographic index species of benthic and planktonic foraminifera; specialized research problems.

Oc 568 Marine Micropaleontology II: Radiolaria and Calcareous Nannoplankton
4 hours 2 ① 2 ③
Stratigraphic distribution; systematics and taxonomy of Radiolaria and calcareous nannoplankton; distribution and abundance of faunas; laboratory identification and classification.

Oc 569 Special Topics in Geological Oceanography
1 2 or 3 hours 1 ① 2 ① or 3 ①

Oc 571
Theoretical Physical Oceanography I
4 hours 3 ① 1 ②
Physics of fluids, basic properties of sea water and sea ice. Introduction to fluid dynamics, with emphasis on derivation of the equations of motion from first principles. Prerequisite: two years of college physics; mathematics through vector calculus.

Oc 572
Theoretical Physical Oceanography II
4 hours 3 ① 1 ②
Theoretical treatment of surface gravity and capillary waves, internal waves, and wave spectra. Theory of wave forecasting. Development of the equations of motion for rotating coordinate systems, and consideration of possihle solutions. Prerequisite: Oc 571.

Oc 573
Theoretical Physical Oceanography III
4 hours 3 ① 1 ②
Basic theories of tides; heat transfer across the sea-air interface; thermohaline circulation; and theoretical discussion of the behavior of light and sound in the sea. Prerequisite: Oc 572.

Oc 574 Wave Dynamics
3 hours 3 ①
Linear and non-linear surface gravity waves, wave statistics, shoaling and reflection. Consent of instructor required.

Oc 579
Special Topics in Physical Oceanography
1 2 or 3 hours 1 ① 2 ① or 3 ①
Consent of instructor required.

GEOPHYSICS COURSES

Gph 501 Research
Gph 503 Thesis
Gph 505 Reading and Conference
Gph 507 Seminar
Terms and hours to be arranged

Gph 581
Theoretical Geophysics: Earth Gravity
3 hours 3 ①
Gravity field and gravity potential, earth ellipsoid; gravity measurements (sea, land, and space), reduction of gravity measurements; gravity anomalies, isostasy, deviations from isostatic equilibrium; internal constitution of the earth. Prerequiste: differential equations; two years of physics; one year of geology. Consent of instructor required.

Gph 582 Theoretical Seismology
3 hours 3 ①
Wave propagation in one-dimensional structures; stress and strain in liquids and solids; propagation of waves in linearly elastic solids; basic solutions, body waves, surface waves, and propagation of elastic energy; theory of guided waves and waves in layered media. Fundamental oscillation modes of the earth. Prerequisite: differential equations; complex functions.

Gph 583 Earthquake Seismology
3 hours 3 ①
Description of earthquakes; types of earthquakes; seismograph theory; seismic ray paths; velocity determinations; shallow and deep earthquakes; magnitude and energies of earthquakes; locating earthquakes; microseisms; seismicity. Prerequisite: Gph 582.

Gph 584 Physics of the Earth
3 hours 3 ①
Effects of confining pressure, temperature, time, and solutions on properties of rocks; earth and moon in solar system; source materials and their reliabilities for determining nature and composition of the earth; composition of core, crust, and mantle; processes within the earth with special reference to their effect on earthquakes, isostasy, crustal structure, island arcs. Prerequisite: differential equations; two years of physics; one year of geology.

Gph 586
Theoretical Geophysics: Magnetics
3 hours 3 ①
Geomagnetic field and magnetic potential; general morphology, secular change, magnetic storms; magnetic measurements, reduction of magnetic measurements; magnetic anomalies, application to structure and composition of crust, mantle, and core of earth. Prerequisite: differential equations; two years of physics; one year of geology. Consent of instructor required.

Gph 589 Special Topics in Geophysics
1 2 or 3 hours 1 ① 2 ① or 3 ①
Permission of instructor required.

PHARMACY

FACULTY

As of January 1974

Charles O. Wilson, Ph.D., Dean of the School of Pharmacy; Professor of Pharmaceutical Chemistry

Robert F. Doerge, Ph.D., Assistant Dean, Head Adviser, Professor of Pharmaceutical Chemistry

Ronald H. Winters, Ph.D., Assistant to the Dean, Associate Professor of Pharmacology

Pharmaceutical Science: PROFESSOR Sager (department head)
ASSOCIATE PROFESSORS Johnson, Sisson, Willms
ASSISTANT PROFESSORS Ayres, Campbell, Hermann, Kettler, Lock
INSTRUCTORS Blecker, Prince, Sharp

Pharmaceutical Chemistry: PROFESSORS Doerge (department head), Wilson
ASSOCIATE PROFESSORS Block, Schultz
INSTRUCTORS Lo, Spencer

Pharmacology and Toxicology: PROFESSOR Fink
ASSOCIATE PROFESSORS Larson (department head), Catalfomo, Constantine, Weber, Winters
ASSISTANT PROFESSORS Hoffman, Speedie
SENIOR INSTRUCTOR Lee

THE SCHOOL OF PHARMACY at Oregon State University is a member of the American Association of Colleges of Pharmacy and is fully accredited by the American Council on Pharmaceutical Education. Its objective is to contribute to the improvement of public health and welfare through dissemination, expansion, and application of knowledge. In so doing the School provides an instructional program assuring academic and technical proficiency in the basic sciences and their pharmaceutical application.

A petition from the pharmacists of Oregon led to the establishment of a Department of Pharmacy at Oregon State College in 1898. The department grew steadily and in 1917 became the School of Pharmacy. The Pharmacy Building, which was designed and constructed specifically for pharmaceutical education, was built in 1925 and extensively remodeled and expanded in 1966.

Holders of the Bachelor of Science in Pharmacy degree can qualify for a wide variety of professional positions. Most graduates engage in the community practice of pharmacy; approximately half are owners or part-owners of pharmacies. Opportunities also exist for pharmacists in hospital and clinic pharmacies; as medical representatives for pharmaceutical manufacturers; as production, control, and research pharmacists in the manufacture of medicinal and pharmaceutical products; as personnel in wholesale drug distribution; as food and drug control chemists or inspectors for local, state, and federal health agencies; as pharmacists in the Public Health Service, the Veterans Administration, the armed forces, and other government agencies; and in pharmaceutical journalism.

Graduates of this school are privileged to become licensed either by examination or reciprocity in all states. California, Florida, and Hawaii permit licensure by examination only.

Adjunct Faculty

The Department of Pharmaceutical Science utilizes practicing pharmacists and physicians as lecturers in the clinical teaching program, in the hospital pharmacy program, in pharmacy management, and in graduate education. Current adjunct faculty are:

Alexander, Phil, B.S., R.Ph., Albany
Anderson, Richard, M.D., Eugene
Anderson, Rodney, B.S., R.Ph., Lebanon
Aumann, K. W., M.D., Corvallis
Beard, John D., B.S., R.Ph., Portland
Bowman, Donald B., M.D., Corvallis
Brooks, Bob L., B.S., R.Ph., Salem
Brown, Ronald, B.S., R.Ph., Portland
Calder, David, M.D., Eugene
Carey, Thomas, M.D., Salem
Christensen, Arnold C.E., B.S., R.Ph., Eugene
Coberly, Ronald W., M.S., R.Ph., Coos Bay
Conklin, Thomas R., M.D., Albany
Corbin, Fred, B.S., R.Ph., Salem
Costa, Donald R., B.S., R.Ph., Lebanon
Craig, E. W. S., M.D., Salem
Curry, Dale, B.S., R.Ph., Eugene
Curtis, Ward, M.D., Albany
Day, Ronald, B.S., R.Ph., Corvallis
Denker, Arthur, M.D., Lebanon
Dowling, Harold, M.D., Lebanon
Emken, Richard, B.S., R.Ph., Monmouth
Endicott, William R., M.D., Albany
Epley, Kenneth, B.S., R.Ph., Eugene
Foulke, T. E., M.D., Corvallis
Goby, Gary, M.D., Albany
Haas, Helmut, M.D., Portland
Haevernick, Kenneth, M.D., Lebanon
Hatfield, Peter, M.D., Lebanon
Henderson, H. J., B.S., R.Ph., Albany
Huppin, Irv., B.S., R.Ph., Portland
Johansen, Leonard, B.S., R.Ph., Eugene
Johnson, Howard, M.D., Lebanon
Johnston, Lael, B.S., R.Ph., Corvallis
Kampfer, Larry, B.S., R.Ph., Philomath
Kernek, Clyde, M.D., Corvallis
Kliewer, D. D., M.D., Corvallis
Knox, George W., M.D., Corvallis
Krakauer, Lewis J., M.D., Corvallis
Lowry, T. W., M.D., Albany
Marino, George, B.S., R.Ph., Albany
Marriot, William, M.D., Corvallis
Mass, Robert E., M.D., Portland
McDonald, W., M.D., Portland
McIntyre, Robert, B.S., R.Ph., Corvallis
McLain, A. G. (Mike), R.Ph., Woodburn
Morris, J. F., M.D., Portland
Orendurff, James R., M.D., Portland
Owings, Gary, M.S., R.Ph., Coos Bay
Park, Jung Y., M.D., Lebanon
Raffensperger, Paul, B.S., R.Ph., Corvallis
Riggs, Glenn J., B.S., R.Ph., Vancouver
Ritzmann, L. W., M.D., Portland
Robertson, K. B., M.D., Corvallis
Rozendal, Robert H., M.D., Corvallis
Sanger, James M., M.S., R.Ph., Portland
Searcy, Edmond, B.S., R.Ph., Salem
Shetcnek, Carl, B.S., R.Ph., Eugene
Smith, F. W., M.D., Portland
Spoler, T. J., M.D., Vancouver
Stebbins, Harold E., B.S., R.Ph., Albany
Steele, Robert E., M.D., Corvallis
Swartsley, George, B.S., R.Ph., Salem
Tefft, Robert R., B.S., R.Ph., Eugene
Terhune, Charles A., M.D., Corvallis
Thomas, Frank D., M.D., Corvallis
Walker, Douglas, M.D., Eugene
Wallace, Logan, B.S., R.Ph., Portland
Walsh, John R., M.D., Portland
West, N. R., M.D., Corvallis
Williams, Bruce, M.D., Corvallis
Wilson, Robert D., M.D., Corvallis

Pharmacy Information

A young man or young woman beginning a career in pharmacy needs to have a combination of natural attributes, education, training, and experience.

A pharmacist has a position of considerable responsibility in the health professions. Carelessness on his part can endanger lives. Therefore, a student going into pharmacy should be of high moral character and needs to be neat, orderly, accurate, and careful with details.

Formal pharmacy education is divided into two parts—two years of prepharmacy, and three years of professional pharmacy. After successful completion of this 5-year course of study, the graduate receives the B.S. degree and becomes eligible to complete the internship requirements described below and to take the examination given by the state Board of Pharmacy. After completion of these requirements a license is granted.

The Prepharmacy Program

The courses required in the freshman and sophomore years—see curriculum on next page—may be taken at any accredited college or university, including Oregon State University.

If a high school graduate fulfills the requirements for admission to OSU (see page 11) he may be admitted to the School of Pharmacy as a freshman. He does not need to have taken any additional specific high school courses, but mathematics, chemistry, physics, and biology, as well as English and speech communication are recommended.

Students from community colleges and from other colleges and universities or from other schools at OSU may transfer into the prepharmacy program at the beginning of any term during their freshman and sophomore years. If they plan to apply for the professional pharmacy program, it is recommended that they transfer into the School of Pharmacy as early as possible, but they can take as much as two complete years elsewhere if their personal situation makes that more convenient.

The Professional Pharmacy Program

The three-year professional pharmacy program—see curriculum on next page—provides a broad scientific base with room for a wide variety of elective courses. A student may take additional courses in business and economics, in various fields of pharmacy, or advanced work in mathematics and chemistry, especially if he or she is interested in retail, industrial, institutional (hospital, Public Health Service), or research pharmacy.

Through judicious selection of elective courses in his last two years, a student may concentrate in such areas as general pharmacy practice, clinical pharmacy, administrative pharmacy, or industrial pharmacy or may prepare for graduate study.

Enrollment in the three-year professional program is limited. A student who has completed the prepharmacy requirements must apply for admission to the professional pharmacy program. Application forms and information about admission policies are available from the School of Pharmacy.

Once admitted to the junior year in pharmacy, students should register for a regular sequence of work as outlined on the next page. The sequence of both professional and nonprofessional required courses in the curriculum must be maintained. A student may register for only those courses for which he has the stated prerequisite courses.

Each student is assigned a faculty adviser according to his class standing. He reviews his future plans and career objectives with his adviser and with his assistance works out the program of courses to be taken. The student must have his proposed schedule approved by his adviser each term before registration.

In order to progress from the Junior year (first year of the professional pharmacy program) to the Senior I year, and from the Senior I year to the Senior II year, the student must have completed all the required Junior year courses and the Senior I year courses, respectively. In addition, the student must have a grade-point average each year of 2.00 or higher, both cumulative and in pharmacy courses.

Each year upperclassmen make several field trips. Annually the fifth-year students tour several pharmaceutical plants in the Midwest with transportation their only expense. As guests of the pharmaceutical houses, they are provided with lodging and meals. Visits to hospitals, wholesale houses, manufacturers in Oregon, and visiting lecturers help to acquaint them with the scope of pharmacy.

University Honors Program

The Honors Program in this School is co-ordinated with the programs in other schools and administered by the Director of the University Honors Program (see page 30). Information concerning eligibility and application forms may be obtained from the Director.

Licensure

Under the provisions of public health laws, it is required that the pharmacist be licensed before he is permitted to compound and dispense drugs and medicines on the prescriptions of doctors, dentists, and veterinarians. In order to become licensed in Oregon a person must be not less than 21 years of age, of good moral character, and a graduate of an accredited school or college of pharmacy that is recognized by the Board of Pharmacy. He must also complete internship requirements and successfully pass an examination given by the Board of Pharmacy.

One calendar year of internship in the various areas of pharmacy under the supervision of a registered pharmacist is a basic requirement. At the option of the State Board of Pharmacy the elective externship in the third professional year may be counted for internship. No internship may count until after the student has finished the junior year in pharmacy at OSU. At least one-fourth of the internship must be obtained after graduation; all of it may be gained after graduation if desired.

Curriculum in Pharmacy

Baccalaureate Degree Programs

The Bachelor of Arts (B.A.) and the Bachelor of Science (B.S.) degrees are offered in the five-year undergraduate program in Pharmacy.

A candidate for a degree must satisfy the university requirements (see page 14), and he must have a total of at least 240 term hours of university-level courses including the approved prepharmacy and professional pharmacy curricula. He must have a grade-point average of 2.00 (C) or higher in all professional pharmacy course work to graduate.

Graduate Study

A need exists for persons with education beyond the B.S. degree to fill positions in industrial research and development, college teaching, government service, hospital pharmacy, and pharmaceutical distribution. The School of Pharmacy offers advanced degrees of Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) in pharmaceutical chemistry, pharmaceutical science, and pharmacology. The M.S. is offered in hospital pharmacy. The Master of Pharmacy (M. Pharm.) degree is offered with a major in hospital pharmacy.

In all cases, advanced degree programs are developed with faculty advisement to meet the interests and objectives of the individual candidate. See GRADUATE SCHOOL for advanced degrees.

Candidates for admission to graduate study must hold a bachelor's degree in pharmacy from OSU or its equivalent, except that for advanced study in pharmacology, acceptance is determined by the Graduate Studies Committee. Candidates must have attained a creditable scholastic average in undergraduate work and have determined a definite objective to be attained through advanced study. All advanced degrees are granted through the Graduate School.

PREPHARMACY CURRICULUM

May be taken at any accredited college or university

First Year

	F Lecture	F Lab	W Lecture	W Lab	S Lecture	S Lab
General Chemistry (Ch 204,205,206)	3	2(3)	3	2(3)	3	2(3)
English Composition (Eng 121)	3	.....	..	.....	..	.....
Calculus (Mth 163)	..	.....	..	.....	4	.....
Physical education	1	.....	1	.....	3	.....
Sociology (Soc 204,205)	3	.....	3	.....	..	.....
Economics (Ec 213,214)	4	.....	4	.....	..	.....
[1]Elective	..	.....	3	.....	3	.....
	16		16		16	

Second Year

[2]Organic Chemistry (Ch 226,227,228,229)	3	.....	3	.....	2	2(2)
Physics (Ph 201,202)	3	1(3)	3	1(3)	..	.....
Biological Science (Bi 211,212)	3	2(2)	3	2(2)	..	.....
Microbiology (Mb 304)	..	.....	..	.....	3	2(2)
Psychology (Psy 201,202)	3	.....	3	.....	..	.....
[3] Elective	..	.....	..	.....	6	.....
	16		16		16	

PROFESSIONAL CURRICULUM

First Professional Year

	F Lecture	F Lab	W Lecture	W Lab	S Lecture	S Lab
Pharmacog (Pcg 330,331)	3	1(3)	3	1(3)	..	.....
Pharm Chem (PCh 323)	3	1(3)	..	.....	..	.....
Pharm Analy Chem (PCh 331)	..	.....	..	.....	3	2(3)
Pharmaceutics (PSc 317)	3	1(3)	..	.....	..	.....
Pharm Technol (PSc 319)	..	.....	3	1(3)	..	.....
Medical Care (PAd 345)	3	.....	..	.....	..	.....
Environ Pharm Serv (PAd 347)	..	.....	3	.....	..	.....
Pharm Serv (PAd 440)	..	.....	..	.....	3	.....
Pharmacology (Phc 390)	..	.....	..	.....	3	.....
Physiology (Z 431,432)	..	.....	3	1(3)	3	1(3)
[3]Electives	3	.....	3	.....	3	.....
	18		18		18	

Second Professional Year

	F		W		S	
[4] Pharmacology (Phc 410,411,412)	4	.....	4	.....	4	.....
Biopharm Chem (PCh 450,451)	4	.....	4	.....	..	.....
Organic Pharm Chem (PCh 324,325)	3	.....	4	.....	..	.....
[5] Pharmacy Practice (PSc 454)	..	.....	..	.....	2	1(3)
Biopharmaceutics (PSc 470)	3	.....	..	.....	..	.....
Pharmacy Law (PAd 451)	..	.....	2	.....	..	.....
Biological Products (Pcg 495)	..	.....	..	.....	4	.....
Hormones (Pcg 433)	..	.....	..	.....	3	.....
[3] Electives	3	.....	3	.....	3	.....
	17		17		17	

Third Professional Year

	F		W		S	
[6] Pharmacy Practice (PSc 455,456)	3	.....	..	.....	3	.....
[6] Pharmacother (Phc 455,456)	4	.....	..	.....	4	.....
[6] Pharm Health Care Org (PAd 448)	3	.....	..	.....	..	.....
Antiinfectives (Pcg 434)	3	.....	..	.....	..	.....
[7] Practicum (PSc, PCh, Phc 409)	..	.....	0–16	.....	..	.....
[3] Electives	3	.....	16–0	.....	9	.....
	16		16		16	

[1] Elective recommended: speech, history (U.S. or Western), or computer science.
[2] Students may substitute Ch 334,335,336, and 337.
[3] The number of elective credits taken during any term may be varied; however, 240 term hours are required for graduation which requires an average of 48 term hours per year.
[4] Continuation of Phc 390.
[5] A new course which is general preparation for the externship elective in the third professional year.
[6] A coordinated groupings of three courses in the Fall Term and two in the Spring Term with subject matter from Pharmacy Practice, Pharmacotherapeutics, and Pharmacist in Health Care Organizations.
[7] An optional (elective) externship program will be available.

PROFESSIONAL ASSOCIATIONS

IN ORDER TO BROADEN the preparation for professional activities and civic responsibilities, students are encouraged to join professional organizations. At Oregon State you may choose among the following:

Oregon-American Pharmaceutical Association.
Open to all students in pharmacy; includes the student branches of both the American Pharmaceutical Association and the Oregon State Pharmaceutical Association.

Rho Chi.
Eligibility for membership in Beta chapter of Rho Chi, national pharmaceutical honor society, is based on high scholastic achievement.

Kappa Psi.
Membership in Beta Zeta chapter of this national professional pharmacy fraternity is limited to qualified men who meet the scholastic requirements.

Lambda Kappa Sigma.
Membership in Rho chapter of this international pharmacy sorority is limited to qualified women in pharmacy who meet the scholastic requirements.

For financial aids, see the last page of this section.

Courses in Pharmacy

PHARMACEUTICAL CHEMISTRY

The Department of Pharmaceutical Chemistry offers undergraduate and graduate courses concerning the chemistry of inorganic and organic therapeutic and pharmaceutical agents used in current medical practice, and courses in qualitative and quantitative drug analysis.

PCh 323. **Organic Pharmaceutical Chemistry.**
4 hours winter. 3 ① 1 ③
Organic chemicals and their preparations used in pharmacy and medicine; correlation between chemical and physical properties and physiological action. Prerequisite: PCh 313; Ch 228,229.

PCh 324,325. **Organic Pharmaceutical Chemistry.**
3 hours fall, 4 hours winter. 3 ① 4 ①
Organic chemicals and their preparations used in pharmacy and medicine; correlation between chemical and physical properties and physiological action. Prerequisite: for PCh 324, fourth-year standing and concurrent enrollment in Phc 410; for PCh 325, PCh 324 and concurrent enrollment in Phc 411.

PCh 331. **Pharmaceutical Analytical Chemistry.**
5 hours spring. 3 ① 2 ③
Principles of quantitative chemical and physical methods used in the analysis of pharmaceuticals. Emphasis on methods in the U.S.P. and N.F. Prerequisite: PCh 323.

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

PCh 401. **Research.**

PCh 403. **Thesis.**

PCh 405. **Reading and Conference.**
Terms and hours to be arranged.

PCh 407. **Seminar.**
Terms and hours to be arranged.

PCh 409. **Practicum.**
Winter. Hours to be arranged
Externship in pharmacies, hospitals, and other health-related areas. Prerequisite: fifth-year standing. Corequisite: PCh 444.

PCh 440,441,442. **Selected Topics.** (g) 3 hours each term. 3 ①
Recent developments in pharmaceutical chemistry and their application to pharmaceutical practice. Topics include: hormones, vitamins, chemotherapeutic agents, CNS depressants and stimulants, cardiovascular drugs, etc. Not all topics covered each year. May be taken in any order. Prerequisite: PCh 325.

PCh 443. **Toxicology.**
3 hours winter. 2 ① 1 ③
Detection of common inorganic and organic poisons; emphasis on alkaloids and synthetics. Prerequisite: fifth-year standing.

PCh 444. **Orientation to Practicum (externship).**
3 hours winter. 3 ①
Application of the principles of chemistry in externship. Prerequisite: fifth-year standing. Corequisite: PCh 409.

PCh 450,451. **Biopharmaceutical Chemistry.** 4 hours fall, winter 4 ①
Biochemical applications of pharmaceutical chemistry. Prerequisite: fourth-year standing and concurrent enrollment in PCh 324 and 325.

PCh 461,462,463. **Special Analytical Methods.** (g)
3 hours each term. 1 ① 2 ③
Advanced quantitative methods, both chemical and physical, as applied to drugs and their dosage forms. Prerequisite: fourth-year standing.

Graduate Courses
See also courses marked (*g*) or (*G*) above.

PCh 501. **Research.**

PCh 503. **Thesis.**

PCh 505. **Reading and Conference.**
Terms and hours to be arranged.

PCh 507. **Seminar.**
Terms and hours to be arranged.

PCh 527,528,529. **Pharmaceutical Chemistry.** 3 hours each term. 3 ①
Natural and synthetic sources of medicinal agents; theoretical bases of biological responses to applied agents; correlation of molecular structure with biological activity. Prerequisite: PCh 325; Phc 412.

PCh 530,531,532. **Pharmaceutical Chemistry Laboratory.**
2 hours each term. 2 ③
To be taken in conjunction with PCh 527, 528,529.

PCh 540,541,542. **Phytopharmaceutical Chemistry.** 3 hours each term. 3 ①
Nomenclature, chemistry, stability, and relationship of structures to pharmacological and toxicological activity of steroids, alkaloids, glycosides, terpenes, and other related compounds of medicinal and pharmaceutical interest. Prerequisite: PCh 325; Phc 412.

PCh 543,544,545. **Phytopharmaceutical Chemistry Laboratory.**
2 hours each term. 2 ③
To be taken in conjunction with PCh 540, 541,542.

PHARMACEUTICAL SCIENCE

The Department of Pharmaceutical Science offers undergraduate and graduate courses in dosage formulation of therapeutic agents and in the pharmacy administration areas related to professional practice, including the economic, social, business, and legal aspects.

PSc 310. **History of Pharmacy.**
2 hours any term. 2 ①
A study of early pharmacy in the Pacific Northwest.

PSc 317. **Pharmaceutics.**
4 hours fall. 3 ① 1 ③
Introduction to the practice of pharmacy including pharmaceutical calculations, medical terminology, the prescription, selected health aids, and liquid dosage forms. Prerequisite: third-year standing.

PSc 318. **Survey of Pharmacy Practice.**
1 hour any term. 1 ②
Observation, identification, and comparison of policies and procedures in various types of pharmacy practice. Consent of instructor required. Prerequisite: PSc 317.

PSc 319. **Pharmaceutical Technology.**
4 hours winter. 3 ① 1 ③
Physical chemical principles which apply to the design, development, and evaluation of dosage forms. Prerequisite: third-year standing.

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

PSc 401. **Research.**

PSc 403. **Thesis.**

PSc 405. **Reading and Conference.**
Terms and hours to be arranged.

PSc 407. **Seminar.**
Terms and hours to be arranged.

PSc 409 **Practicum.**
Winter. Hours to be arranged
Externship in pharmacies, hospitals, and other health-related areas. Corequisite: PSc 444.

PSc 420. **Health Center Pharmacy Experience.**
1 hour any term. 1 ③
Prerequisite: fourth-year standing.

PSc 444. **Orientation to Practicum (externship).**
3 hours winter. 3 ①
Introduction to application of the principles of pharmaceutical science in externship. Prerequisite: fifth-year standing. Corequisite: PSc 409.

PSc 454. **Pharmacy Practice.**
3 hours spring. 3 ①
Prescription department procedures and introduction to clinical pharmacy. Prerequisite: fourth-year standing.

PSc 455,456. **Pharmacy Practice.**
3 hours fall, spring 2 ① 1 ③
Continuation of PSc 454. Prerequisite: fifth-year standing.

PSc 460. **Hospital Pharmacy.**
3 hours any term. 2 ① 1 ③
The specialized area of hospital pharmacy. Limit 20. Prerequisite: fourth-year standing, consent of instructor.

PSc 464,465. **Manufacturing Pharmacy.** (G)
3 hours winter and spring. 1 ① 2 ③
Development and production of drug products. Prerequisite: fifth-year standing.

PSc 470. **Biopharmaceutics.**
3 hours fall. 2 ① 1 ③
Influence of pharmaceutical formulations on biological activity of drugs. Prerequisite: fourth-year standing.

PSc 480. **Drug Information Services.** (G) 3 hours any term. 1 ① 2 ③
Prerequisite: fifth-year standing.

Graduate Courses
See also courses marked (*g*) or (*G*) above.

PSc 501. **Research.**

PSc 503. **Thesis.**

PSc 505. **Reading and Conference.**
Terms and hours to be arranged.

PSc 507. **Seminar.**
Terms and hours to be arranged.

PSc 510. **Physical Pharmacy.**
3 hours. 2 ① 1 ③
Physico-chemical properties of pharmaceutical systems.

PSc 512,513. **Manufacturing Pharmacy.**
3 hours winter and spring. 1 ① 2 ③
Unit operations in manufacture of pharmaceuticals.

PSc 520,521,522. **Hospital Pharmacy.**
3 hours each term. 3 ①
The organization and operation of a hospital pharmacy.

PSc 554,555,556. **Product Development.** 3 hours each term. 1 ① 2 ③
Current and novel dosage forms; product stability; therapeutic designs.

PAd courses are now combined with PSc courses in Pharmaceutical Science.

PAd 201. **Pharmacy Orientation.**
2 hours fall or spring. 2 ①
Open to nonpharmacy students.

PAd 345. **Medical Care.**
3 hours winter. 3 ①
Organization and financing of public and personal health services. Prerequisite: third-year standing.

PAd 347. **The Environment of Pharmaceutical Services.**
3 hours spring. 3 ① 1 ①
Environment and appraisal of drug distribution and use. Prerequisite: PAd 345.

PAd 440. **Pharmaceutical Services.**
3 hours spring. 3 ①
Identifying drug need and the activities involved in providing drug care to defined population segments. Prerequisite: PAd 347; third-year standing.

PAd 448. **Pharmacists in Health Care Organizations.**
3 hours fall. 3 ①
Structural and behavioral concepts of organization applicable to pharmacists' adaptation within complex organizations. Prerequisite: fifth-year standing.

PAd 449. **Community Pharmacy Management.**
3 hours. 3 ①
Activities involved in planning, organizing, and controlling a community pharmacy. Prerequisite: PAd 448.

PAd 450 **Drug Law.**
3 hours winter. 3 ①
Concepts, laws, and agencies regulating the distribution of drug and related products. Prerequisite: PAd 347.

PAd 451. **Pharmacy Law.**
2 hours winter. 2 ①
Federal, state, and local laws regulating pharmacy. Prerequisite: fourth-year standing.

PAd 452. **Medical Care Systems.**
3 hours. 3 ①
Contemporary and proposed systems of organizing medical care. Prerequisite: PAd 345.

PAd 453. **Pharmacy Socio-Economics.**
3 hours. 3 ①
Contemporary social and economic forces which affect the practice of pharmacy. Prerequisite: PAd 440.

PAd 454. **Pharmacy Planning.**
3 hours. 2 ① 1 ③
Activities associated with location and layout of a pharmacy. Prerequisite: PAd 448.

PAd 540,541. **Drug Distribution.**
3 hours. 3 ①
Changing patterns, changing market structures and behavior of institutions distributing drugs and pharmaceuticals for ultimate consumption. Prerequisite: PAd 440,451.

PAd 587. **Pharmaceutical Marketing: Analysis and Techniques.**
3 hours. 3 ①
Marketing policies and practices of manufacturers in distribution of drug products restricted by law to prescription use only. Prerequisite: PAd 440.

PAd 588. **Pharmaceutical Economics.**
3 hours. 3 ①
Demand analysis and production functions, organization, conduct, performance, and implications of policy among firms in the pharmaceutical industry. Prerequisite: PAd 347.

PAd 589. **Pharmaceutical Economics.**
3 hours. 3 ①
Aggregative pharmaceutical services, interrelationships with other medical services; personnel, facilities, financing, prices, costs, supply, organization and coordination. Prerequisite: PAd 345.

PAd 599. **Drug Trade Regulations.**
3 hours. 3 ①
Anti-trust laws and methods of resale price maintenance, regulatory agencies, related to distribution of drug products. Prerequisite: PAd 451.

PHARMACOLOGY AND TOXICOLOGY

The Department of Pharmacology and Toxicology offers undergraduate and graduate instruction, conducts research, and provides information on drugs and chemicals of natural and synthetic origin. Divisions include *pharmacognosy*, which deals with the economic and biological aspects of drugs from natural sources (plant products, hormones, and other animal products, and immunologicals and antibiotics from microorganisms); *pharmacology*, which deals with the characterization and measurement of the actions of drugs on living things (physiological responses, mode of action, pathophysiology, and therapeutic applications including chemotherapy); and *toxicology*, which deals with the deleterious effects of drugs and other chemicals (drug abuse and overdose, accidental, occupational, and environmental poisoning).

Phc 315. **Safety in Use of Drugs.**
2 hours any term. 2 ①
Origin and development of drugs, their purpose, uses and shortcomings, dangers, and misuse. Prerequisite: sophomore standing, nonpharmacy major.

Phc 380. **Drug Education.**
3 hours any term. 3 ①
Pharmacologic principles, drug use, abuse, dependence, and laws. Prerequisite: one year of a basic science; nonpharmacy major.

Phc 390. **Pharmacology.**
3 hours spring. 3 ①
Pharmacodynamics, toxicity, and therapeutic uses of drugs. Prerequisite: third-year standing for pharmacy students.

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Phc 401. **Research.**
Phc 403. **Thesis.**
Phc 405. **Reading and Conference.**
Terms and hours to be arranged.

Phc 407. **Seminar.**

Phc 409. **Practicum.**
Winter Hours to be arranged
Externship in pharmacies, hospitals, and other health-related areas. Prerequisite: fifth-year standing. Corequisite: Phc 444.

Phc 410,411,412. **Pharmacology.** (g)
4 hours each term. 4 ①
Continuation of Pharmacology 390. Prerequisite: for Phc 410, fourth-year standing for pharmacy students.

Phc 414. **Pharmacology Laboratory.** (g)
1, 2, or 3 hours. 1 ③, 2 ③, or 3 ③
May be repeated for credit. Prerequisite: fourth or fifth year for pharmacy students.

Phc 444. **Orientation to Practicum (externship).**
3 hours winter 3 ①
Application of the principles of pharmacology in externship. Prerequisite: fifth-year standing. Corequisite: Phc 409.

Phc 454. **Commercial Poisons.** (G)
3 hours fall. 3 ①
Toxicology of common household, medicinal, industrial, and economic poisons. Prerequisite: fifth-year standing.

Phc 455,456 **Pharmacotherapeutics.**
(G) 4 hours fall, spring. 4 ①
Discussion of disease states: pathogenesis, symptoms, pharmacological basis of therapy. Prerequisite: fifth-year standing.

Graduate Courses
See also courses marked (g) or (G) above.

Phc 501. **Research.**
Phc 503. **Thesis.**
Phc 505. **Reading and Conference.**
Terms and hours to be arranged.

Phc 507. **Seminar.**
Terms and hours to be arranged.

Phc 515. **Environmental Toxicology.**
2 hours. 2 ①
Nature and public health aspects of environmental contaminants. Prerequisite: two years of chemistry; two years of biology.

Phc 520,521,522. **Advanced Pharmacology.** 2 hours each term. 2 ①
Lectures and conferences on advanced concepts and applications of pharmacologic actions of drugs. Prerequisite: Phc 412; BB 352, or equivalent.

Phc 523,524,525. **Advanced Pharmacology Laboratory.**
1 hour each term. 1 ③
To be taken in conjunction with Phc 520,521, 522.

Phc 530,531. **Advanced Toxicology.**
3 hours winter and spring. 2 ① 1 ③
Lectures, conferences, and laboratories on advanced concepts and mechanisms of toxicity of drugs and other chemicals. Prerequisite: Phc 412; BB 352, or equivalent.

Phc 535. **Pharmacometrics.**
3 hours fall. 2 ① 1 ③
Evaluation of drug activity by various pharmacologic techniques, screening methods, official and other bioassays. Prerequisite: St 452; Phc 412.

Phc 590T. **Drug Use and Abuse.**
2 hours summer to be arranged.

Pcg courses are now combined with Phc courses under Pharmacology.

Pcg 330,331. **Pharmacognosy.**
4 hours fall and winter. 3 ① 1 ③
Official and important nonofficial drugs of biological origin; macroscopic, microscopic, and micro-chemical identification. Prerequisite: third-year standing.

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Pcg 433. **Hormones.**
3 hours spring. 3 ①
Development, dosage forms, use, and stability. Prerequisite: fourth-year standing.

Pcg 434. **Antiinfectives.**
3 hours fall. 3 ①
Development, dosage forms, use, and stability of drug products used to treat infections and infestations. Prerequisite: fifth-year standing.

Phc 444. **Orientation to Practicum. (externship).**
3 hours winter. 3 ①
Application of the principles of Pharmacology in externship. Prerequisite: fifth-year standing. Corequisite: Phc 409.

Pcg 454,455. **Pharmacognosy.** (G)
3 hours winter and spring. 1 ① 2 ③
Extraction, isolation, and identification of active components from drug plants. Prerequisite: Pcg 332.

Pcg 471,472. **Pharmacognostical Techniques.** (G)
3 hours fall and winter. 1 ① 2 ③
Pcg 471: Microscopic techniques. *Pcg 472:* Research Methods. Prerequisite: Pcg 332.

Pcg 476. **Plant and Animal Poisons.**
3 hours spring. 3 ①
Toxicology of plant and animal constituents potentially hazardous to man. Prerequisite: junior standing. Consent of instructor required.

Pcg 495. **Biological Products.**
4 hours spring. 4 ①
Vaccines, serums, antitoxins, and related products. Prerequisite: fourth-year standing.

Graduate Courses
See also courses marked (*g*) or (*G*) above.

Pcg 540,541,542. **Natural Products.**
3 hours each term. 1 ① 2 ③
Laboratory work concerned with isolation, purification, and estimation of active components of medicinal plants: *Pcg 540:* glycosides; *Pcg 541:* alkaloids; *Pcg 542:* volatile oils, resins, related compounds. Prerequisite: Pcg 332.

Pcg 545. **Phytochemistry of Drug Plants.** 3 hours. 3 ①
The distribution of certain secondary plant constituents. Prerequisite: Pcg 455 or equivalent.

Pcg 550,551,552. **Biogenesis of Medicinal Plant Constituents.**
3 hours each term. 3 ①
Pcg 550: Glycosides. Possible metabolic pathways. *Pcg 551: Alkaloids.* Nitrogen metabolism within plants and formation of alkaloids. *Pcg 552: Lipids, Resins, and related compounds.* Formation within living plant. Prerequisite: BB 450,451,452, or equivalent.

FINANCIAL AIDS

STUDENTS OF ABILITY AND PROMISE may have part of their college expenses paid through one of the scholarship funds.

In addition to general scholarships awarded to OSU students, the ones listed below are available to pharmacy students. Special loan funds are also available.

SCHOLARSHIPS AND LOANS

Health Professions Scholarships: Varying amounts annually to full-time pharmacy juniors and seniors who are citizens or are lawfully admitted for permanent U. S. residence, have financial need, and maintain a 2.50 GPA. Application through Financial Aid Office, Plageman Hall, Room 108.

Lane County Scholarship. A scholarship to a deserving student in pharmacy from Lane County or surrounding area provided by the registered pharmacists of that county.

Dargavel Scholarship and Loan Fund. $200 annually for an Oregon senior in pharmacy who has stimulated professionalism among his fellow students. Loans are also available for pharmacy students from the John B. Dargavel Foundation. They are administered by the National Association of Retail Druggists and may be repaid after graduation.

Women's Auxiliary, OSPA Loan Fund. The Women's Auxiliary of the Oregon State Pharmaceutical Association provides loans for senior women in pharmacy, the amount varying according to need with repayment after graduation.

Golden Fund. The Frank and Esther Golden Student Aid Fund, established by the will of Esther L. Golden, provides several modest grants for pharmacy students who have demonstrated superior scholastic ability and financial need.

Oregon State Pharmaceutical Association Loan Fund. Loans available to pharmacy students through the Financial Aids office.

Corbett Fund. Selected Oregon students, preferably from Harney County, who are in their last three years of pharmacy may borrow from a fund established in memory of Orville Corbett.

HONORS AND AWARDS

Several national undergraduate awards are given to students in pharmacy schools for the best essays in various fields of pharmacy. Outstanding scholarship or notable achievement in the School of Pharmacy at Oregon State University is recognized by the awards listed:

Bristol Laboratories Award. A personalized medical dictionary awarded annually to a senior who has combined scholarly achievement with professional service.

Johnson and Johnson Award. To the senior who exhibits interest and excellence in pharmacy administration.

Lambda Kappa Sigma Award. Awarded to a graduating senior selected on the basis of high academic achievement, leadership, and professional interest.

Lilly Achievement Award: A gold medal awarded to a senior student for superior scholastic and professional achievement.

Oregon Society of Hospital Pharmacists Award. A copy of Facts and Comparisons presented to two graduating seniors who have shown aptitude and distinct interest in hospital pharmacy.

McKesson and Robbins Presidential Plaque. Awarded to the president of the Student Branch of Oregon—American Pharmaceutical Association.

McKesson and Robbins Award. $50 awarded annually by the Portland Branch of the company to the senior scoring highest in a comprehensive examination in pharmacy. The recipient's name is engraved on a plaque in the School of Pharmacy.

Merck Awards. Two sets of reference books awarded annually to seniors having highest scholastic averages in pharmacy and in pharmaceutical chemistry.

Portland Retail Druggists Association Plaque. Awarded annually to the graduating senior who attains the highest scholastic rank in his class.

Rexall Trophy. Awarded annually to the senior who presents the most outstanding record of service to the School of Pharmacy while maintaining a high scholastic average.

Rho Chi Award. An advanced reference work in pharmacy or related field awarded each year to a junior having the highest scholastic rating in professional studies.

Upjohn Award: A plaque awarded to a graduating senior for outstanding service to the School of Pharmacy or to the community.

Class Service Awards. Awarded annually to the student who has best served the school and his class by his activities while at OSU.

RESERVE OFFICERS TRAINING CORPS

Armed Forces Officer Education

FOR MORE THAN A CENTURY, military training has been offered at Oregon State University. Fulfilling a provision of the Morrill Act of 1862, which gave Corvallis College its first public support, a Cadet Corps was organized about 1872 and was continued thereafter under the direction of a U. S. Army officer assigned to the faculty. Cadets trained in the early years served as officers in the Spanish-American War.

On June 3, 1916, Congress passed an act which brought about the reorganization of the Cadet Regiment into a Reserve Officers Training Corps (ROTC) unit in 1917. In World Wars I and II and in subsequent international conflicts, OSU graduates have served with distinction and have given proof of the high quality of their preparation and the value to the nation of such military instruction.

At the end of World War II, on September 17, 1945, the Secretary of the Navy commissioned the Department of Naval Science (NROTC) on this campus to provide for the training of both Navy and Marine Corps officers. On July 1, 1949, the U. S. Air Force activated an AFROTC unit that is now called the Department of Aerospace Studies. Oregon State is now one of the 30 or so colleges and universities that offer education for all three military departments.

Originally, two years of military science and tactics were required of all able-bodied male students, but since 1962, ROTC has been voluntary. Since 1965, two-year programs have been available for students who have finished two years of college but have not taken ROTC previously.

As opportunities for women to serve as officers in the armed forces grow, opportunities for women to participate in ROTC programs expand. Women have long been eligible to take ROTC course work for credit. Since 1970 they have been enrolled as cadets in Air Force ROTC and plans are underway to accept them in Army and Naval programs also.

Mission and Objectives. The ROTC selects and prepares young men and women, through a program of instruction coordinated with the students' normal academic curriculum, to serve as officers in the Regular and Reserve components of the Army, Navy, Air Force, and Marine Corps. Each of the units on this campus strives to develop in students a capacity for leadership, to develop them morally, mentally, and physically, and to provide them with the basic working knowledge required of a young officer.

Uniforms and allowances. Students in each of the units receive uniforms to be worn at drill periods and on special occasions. During the final two years, students receive $100 per month subsistence pay for up to 20 months. Travel to and from any summer camps or cruises is paid. While at camp or on cruise, the members receive food and quarters at government expense in addition to basic pay. See the individual sections for further information on the various camps and cruises. Those selected for the scholarship programs receive tuition, books, and fees plus $100 per month subsistence pay for up to 40 months.

Flight training. Eligible students in each of the three units may request and be selected for flight training during their senior year. This training, provided at government expense, leads to a private pilot license and an opportunity to continue flight training in a commissioned officer status.

How to enroll. See the Army, Navy, or Air Force sections for enrollment details for the various ROTC programs. All three departments are manned throughout the year during normal school hours to answer any inquiries regarding the ROTC programs.

Department of Aerospace Studies

Personnel detailed from U.S. Air Force as of July 1974

PROFESSOR: Colonel C. G. Memminger, Commander

ASSOCIATE PROFESSOR: Lt. Colonel Christensen

ASSISTANT PROFESSORS: Major Wilhelm; Captain Capito

INSTRUCTORS: Technical Sergeants Schwinabart, Harkins; Staff Sergeants Hale, Becker

Air Force officers are required to create the ideas, develop and operate the specialized equipment, fly the planes, manage the weapon systems, and lead the men and women who are the aerospace power for peace. The Air Force requirement for professional officers spans most academic fields. Today's officers must be college graduates. Many pursue advanced degrees. Developing the attributes necessary for the career professional officer is the mission of the Air Force ROTC. Eligible students

desiring to be officers in the United States Air Force through the AFROTC program may take either a two-year or a four-year sequence of studies:

Four-Year Program

1. Students register for AS 1 (AS 111) in the fall term of their freshman year and continue throughout the four-year curriculum.

2. Curriculum: 30 credit hours in Aerospace Studies I (AS 111,112, 113); Aerospace Studies II (AS 211,212,213); Aerospace Studies III (AS 311,312,313); AS 314 (four weeks field training); and Aerospace Studies IV (AS 411,412,413).

3. Previous military experience (ROTC, Academy, or military service) may allow the Professor of Aerospace Studies to waive all or part of the General Military Course (freshman and sophomore years) for students enrolled in the four-year AFROTC program.

Two-Year Program

1. This program provides an opportunity for students who did not elect the four-year ROTC program upon entering college.

2. Application is made early in the fall term of the student's sophomore year. Processing is accomplished during the winter term and selections are made in spring term of the sophomore year. Selectees attend mandatory six-week summer field training (AS 214) prior to the junior year of college. Applicants must have two years remaining in college *after* the six-week field training. This may be undergraduate or graduate work or a combination.

3. Curriculum: 24 credit hours in AS 214 (six-week field training); Aerospace Studies III (AS 311,312,313); and Aerospace Studies IV (AS 411,412,413).

Commitments: Nonscholarship cadets incur no obligation during the first two years in AFROTC. The student agrees to accept a commission, if offered, only after enrolling in AS 311. Scholarship recipients agree to accept a commission upon accepting the scholarship. Upon commissioning, pilots and navigators incur an obligation of five years after completion of flying training at an Air Force Base; all others agree to serve for four years following commissioning.

Scholarships are available for a limited number of qualified students on a competitive basis. High school seniors interested in applying should consult their high school counselors in their junior year or early in their senior year. University cadets already in the two- and four-year AFROTC programs compete for the grants on the basis of grade-point average, Air Force Officer Qualifying Test scores, and an interview board's evaluation. Students receiving scholarships must be able to complete the Air Force ROTC program, receive a degree, and be commissioned by age 25. Each scholarship covers the cost of full tuition, laboratory fees, incidental expenses, textbooks, and an allowance of $100 a month.

Field Training: Under either Air Force ROTC program the student takes only one summer field training session. The two-year program requires six weeks of field training; the four-year program requires four weeks. Students are paid varying amounts for each of these training periods. This pay is in addition to travel pay to and from the field training location.

Standards: Cadets must be U. S. citizens of sound physical condition and high moral character. They must complete ROTC and receive a degree prior to age 26½ if designated for flight training, or otherwise prior to age 30, to be recommended for commissioning as Air Force officers.

Distinguished Air Force ROTC Graduates: Outstanding advanced course cadets may be designated Distinguished Air Force ROTC Cadets at the beginning of their senior year and designated Distinguished Air Force ROTC Graduates prior to graduation.

Comajors: A student may include PS 418, 420, and 443 to provide a comajor in Aerospace Studies with the major he submits for a degree.

Further Educational Opportunities: After completion of AFROTC requirements, advanced degrees may be sought by delaying active duty commitments. Some commissioned officers continue advanced studies with the Air Force Institute of Technology. Special provisions are available for medical, law, and meteorology students. For further information, contact the Air Force ROTC, 229 Gill Coliseum.

Lower Division Courses

AS 111,112,113. **Aerospace Studies I.**
1 hour each term. 1 ① 1 ①
General Military Course (GMC): The doctrine, mission, and organization of the USAF; U.S. strategic offensive and defensive forces, their mission, function, and employment of weapons; civil defense; aerospace defense; missile defense; U.S. general purpose and aerospace support forces; the mission, resources, and operation of tactical air forces, with special attention to limited war; review of Army, Navy, and Marine Corps general purpose forces. Corps Training: Leadership, discipline, tradition, and courtesies of the service.

AS 211,212,213. **Aerospace Studies II.**
1 hour each term. 1 ① 1 ①
General Military Course (GMC): The development of air power: Changes in the nature of military conflict; development of air power into a primary element of national security; development of concepts and doctrine governing employment of air power; technology affecting growth and development of air power; the changing mission of the defense establishment, with emphasis on the U.S. Air Force; air power as employed in military, non-military, and strategic operations.

AS 214. **Field Training.** 6 hours summer.
Six-week field training (for two-year program applicants); education and training comparable to that received by the four-year program cadet during his freshman (AS I) and sophomore (AS II) years on campus and his four-week field training period (AS 314). Conducted at an Air Force Base. Prerequisite: qualify for POC.

Upper Division Courses

AS 311,312,313. **Aerospace Studies III.**
3 hours each term. 3 ① 1 ①
Professional Officer Course (POC): National Security Forces in contemporary American society: Civil-military relations and environmental context in which U.S. defense policy is formulated and effected; role of the professional military leader-manager in a democratic society; societal attitudes towards the armed forces; requisites for maintaining adequate national security forces; political, social, economic constraints on national defense structure; impact of technological and international developments on strategic preparedness and the overall policy making process.

AS 314. **Field Training.** 6 hours summer.
Four-week field training (for four-year program students); supplements campus courses in developing leadership and discipline. Mission, organization and functions of an Air Force Base; marksmanship, survival, and physical training; aircrew and aircraft indoctrination; orientation on specific opportunities in career fields. Conducted at an Air Force Base. Prerequisite: AS II or III.

AS 350. **Aerospace Studies.**
3 hours. 2 ②
Principles of flight, weather, and navigation; aerodynamic reactions; meteorology; flight computers; navigation; flight planning; and associated federal air regulations. Prerequisite: AS 312.

AS 405. **Reading and Conference: Aerospace Studies.**
1 to 3 hours. Terms and hours arranged by instructor.
Supervised individual work. Consent of instructor required.

AS 411,412,413. **Aerospace Studies IV.**
3 hours each term. 3 ① 1 ①
Professional Officer Course (POC). Professionalism; leadership and management theory, practice, tools and controls; responsibilities; military justice; human relations; personnel policies; channels of communication; problem solving. Corps Training to continue officer development. Prerequisite: AS III.

Department of Military Science

Personnel detailed from U.S. Army as of January 1974

PROFESSOR: Colonel E. J. Fulsang, Jr. (Field Artillery), Commander

ASSOCIATE PROFESSORS: Lieutenant Colonels Terpstra (Corps of Engineers), Ward (Quartermaster Corps)

ASSISTANT PROFESSORS: Major Case (Field Artillery); Captains Bowman (Field Artillery), Nelson (Infantry), Oakley (Infantry)

INSTRUCTORS: Sergeant Major Graham; Master Sergeant Linschoten; Staff Sergeant Ellis

Instruction in the Military Science Department is designed to produce junior officers for the United States Army in both the reserve and regular components. The basic military education in this department provides, in conjunction with the student's regular course of study, the background and attributes essential to the Army officer.

The Army ROTC commissioning program is comprised of: (1) either the Basic Course or Basic Summer Camp; (2) the Advanced Course; (3) the Advanced Summer Camp; and (4) authorized electives from other schools of the University. Upon completion of the four-year military science course, the student will have received 33 credit hours, all of which are reflected in his university grade-point average. Those students taking the "two-year" course, that is, substituting Basic Summer Camp for the Basic Course, will have received 30 credit hours at completion of the Military Science Course.

a. The Basic Course consists of freshman classes each term for which the student receives one credit hour each, and classes each term of the sophomore year for which he receives 2 credit hours per term. (Students who have not taken the Basic Course may attend a six-week Basic Summer Camp at the end of their sophomore year and thereby become eligible for the Advanced Course. This provision allows students transferring from junior colleges, graduate students, or students who for other reasons have not taken the Basic Course, to enter the commissioning program.)

b. Students in the Advanced Course, the junior and senior years, receive 3 credit hours per term.

c. The Advanced Summer Camp, which normally is attended between the junior and senior years, is six weeks in duration and 6 credit hours are awarded for it by the University.

d. While enrolled in the Advanced Course, the cadet will take 9 credit hours of selected electives. Credit for these electives is in addition to the Military Science Advanced Course and will satisfy requirements for ROTC and for the student's primary course of study. Electives will be selected with the advice of the departmental faculty from electives approved by the PMS. Only subjects which are not required in the student's normal academic curriculum during the freshman and sophomore years will be selected to meet this requirement. A student may submit Military Science as a comajor for a baccalaureate degree if he includes sufficient credit hours of either PS 417,418,419,420,422,429, or 443 as electives to increase hours creditable to Military Science to a total of 36.

Successful completion of the program in Military Science leads to a commission as an officer in one of fifteen branches of the Army. A student who successfully completes the cadet flight training program may be selected for Army Flight Training which will qualify him as an Army Aviator.

Enrollment in the Advanced Course. Each student enrolled in the Advanced Course of the ROTC must:

1. Be selected by the professor of Military Science and the President of Oregon State University.
2. Be able to complete requirements for commission before reaching 28 years of age (may be waived for applicants who have demonstrated exceptional ability).
3. Have successfully completed such survey and general screening tests as may be prescribed.
4. Have completed the Basic Course, or the Basic Summer Camp, or received credit in lieu thereof for having had previous honorable active service in the Army, Navy, Marine Corps, Coast Guard, or Air Force.
5. Be a citizen of the United States.
6. Be physically qualified under standards prescribed by the Department of the Army. Due allowance will be made for those defects that are correctable before the student becomes eligible for appointment as a commissioned officer.
7. Be accepted by Oregon State as a regularly enrolled student.
8. Execute a written agreement with the United States to complete the Advanced Course, contingent upon remaining in college; to attend summer camp at time specified unless deferred for cogent reasons; to accept a commission if offered; and satisfy the service obligation after graduation.

Pay. Advanced course cadets receive a subsistence allowance at the rate of $100 each school month excluding the Advanced Camp period. In addition, they are paid one-half a Second Lieutenant's monthly pay and a mileage allowance for the six-week Advanced Summer Camp period.

Commissions. For a reserve commission a student must meet the following minimum requirements:

1. The student must have received a baccalaureate degree.
2. The student must successfully complete the course in Military Science. The branch of service in which the student is commissioned is determined by the student's academic standing, his individual desires, and the needs of the Army.

Distinguished Military Students may apply for appointment as commissioned officers in the Regular Army. They must possess outstanding qualities of military leadership, high moral character, and definite aptitude for the military services, be between the ages of 21 and 27 years, and meet physical standards.

Scholarships. Army ROTC offers four types of scholarships. Each pays full tuition, book costs, laboratory and incidental fees, and $100 subsistence pay each school month for the term of the scholarship. (This is not paid in addition to the subsistence pay that all Advanced Course cadets get, but is an alternative financial aid program.) The four-year scholarships are awarded to selected applicants from among high-school seniors.

Three-year, two-year, and one-year scholarships are available to selected freshman, sophomore, and junior ROTC cadets. Students who substitute the Basic Summer Camp for the Basic Course are not eligible for a scholarship. Full information on Army ROTC Scholarships may be obtained by contacting the Department of Military Science of the University.

Lower Division Courses

MS 111,112,113. Military Science I.
1 hour each term. 2 ①
Fundamentals of Leadership and Management. Leadership communication methods; organization of the Army and ROTC; historical growth and development of the Defense Establishment; military geography and introduction to service weapons; leadership laboratory.

MS 211,212,213. Military Science II.
2 hours each term. 3 ①
Applied Leadership and Management. American military history; introduction to basic military tactics and operations, and the functions, duties, and responsibilities of junior leaders; leadership laboratory.

MS 214. Basic Summer Camp.
6 hours.
Six weeks of instruction at Fort Knox, Kentucky; substitute for the first two years of the ROTC program.

Upper Division Courses

MS 311,312,313. Military Science III.
3 hours each term. 4 ①
Advanced Leadership and Management. Leadership communication methods; case studies in leadership and management; small unit operations; branch orientation; leadership laboratory. Selected academic subjects.

MS 314. Advanced Summer Camp.
6 hours.
Practical and theoretical instruction for six-nine weeks at a military installation. Prerequisite: MS 311,312,313.

MS 405. Reading and Conference.
1 to 3 hours. Terms to be arranged.
Consent of Professor of Military Science required.

MS 411,412,413. Military Science IV.
3 hours each term. 4 ①
Theory and Dynamics of the Military Team. Combat operations and the leadership and management problems involved; position of the United States in the contemporary world; obligations and responsibilities of an officer on active duty; leadership laboratory. Selected academic subjects.

Department of Naval Science

Personnel detailed from United States Navy and Marine Corps as of January 1974

PROFESSOR: Captain C. G. Dimon, Jr. (USN), Commanding Officer

ASSOCIATE PROFESSOR Lt. Col. J. F. Rice (USMC) Executive Officer

ASSISTANT PROFESSORS: Major Ripley (USMC): Lieutenants Weeks (USN), Selmer (USN), Janik (USN), Moore (USN)

INSTRUCTORS: Master Chief Machinist Mate Martin (USN); Senior Chief Yeoman Erickson (USN); Chief Quartermaster Freeman (USN); Storekeeper First Class Semones (USN), Staff Sergeant Allen (USMC)

SCHOLARSHIP STUDENTS

Scholarship students are selected through national competition. Successful applicants are appointed Midshipman, USNR, by the Secretary of the Navy. During four years of college, the Navy pays tuition, cost of textbooks, other fees of an instructional nature, and subsistence allowance of $100 per month for up to 40 months. Graduates are offered commissions as Ensign, United States Navy, or Second Lieutenant, United States Marine Corps, and are required to serve on active duty for four years. Application forms for the scholarship program may be obtained from any NROTC Unit or Navy-Marine Corps Recruiting Office.

COLLEGE PROGRAM STUDENTS

Four-Year College Program students are selected by the Department of Naval Science at Oregon State University from voluntary applicants. While enrolled in the advance course, the last two years of college, successful applicants receive subsistence amounting to $100 per month. Graduates are offered commissions as Ensign, U.S. Naval Reserve, or Second Lieutenant, U. S. Marine Corps Reserve, and are required to serve on active duty for three years.

Two-Year College Program selections are made on a national basis from nominations submitted by the Professor of Naval Science. Selectees for enrollment in this program attend a Naval Science Institute during the months of July and August after selection. While at the Naval Science Institute, students will receive a course of instruction in Naval Science and drill. Successful completion of the Naval Science Institute will qualify students for enrollment in the advanced course of the NROTC College Program. Applicants must be in their second year of college or third year of a five-year curriculum in good standing with not less than a "C" average.

Outstanding College Program students may be awarded scholarship status by the Professor of Naval Science.

Students receive draft deferment while enrolled in all NROTC Programs.

Any university student may, with the prior approval of the Professor of Naval Science, undertake naval science courses for credit. Such student, however, is classified as a Naval Science student and is not actually enrolled in the NROTC program. NROTC students also have the opportunity to request participation in graduate programs.

Requirements. Every acceptable NROTC candidate applying for any of the NROTC Programs must:

1. Be a citizen of the United States.
2. Be accepted for admission or enrolled in the University.
3. Be 17 years of age and must be capable of receiving first baccalaureate degree prior to 25th birthday.
4. Be physically qualified in accordance with the physical standards established by the Department of the Navy.
5. Possess a satisfactory record of moral integrity and have potential officer characteristics.
6. Have no moral obligations or personal convictions that will prevent him from conscientiously bearing arms and supporting and defending the Constitution of the United States against all enemies foreign and domestic.

Status and Curriculum. Students enrolled in the NROTC program are not on active duty. They wear the uniform only for drills, on special occasions, and during the summer at sea training periods.

The program of study fits into curricula leading to first baccalaureate degrees. It includes the following minimum requirements for all programs:

1. Three term hours of Naval Science per term.
2. One term of computer science. CS 101 is considered norm for this requirement.

In addition, students in the Scholarship Program must complete the following requirements by the end of the sophomore year:

1. Three terms of college physics.
2. Three terms of calculus with analytic geometry.

Naval Science (including summer training) pursued for four years in one of the undergraduate curricula constitutes a co-major with all of the majors offered in degree-granting divisions of schools.

Lower Division Courses

NS 111,112,113. Naval Science I.
3 hours each term. 5 ①
Naval Organization and Administration, Naval Ships Systems. NS 111: Introduction to structure and principles of naval organization. *NS 112, 113:* Types, structures, purpose, and safe operation of naval ships.

NS 211,212,213. Naval Science II.
3 hours fall, winter, and spring. 5 ①, 5 ①, 5 ①
American Military Affairs and National Security Policy. NS 211, 212: Military affairs in the United States from American Revolution to present. *NS 213:* Formulation and implementation of American security policy.

Upper Division Courses

NS 311,312,313. Naval Science III.
3 hours each term. 5 ①
Navigation and Naval Operations: NS 311, 312: Science of navigation—piloting, celestial navigation, and electronic aids. *NS 313:* Fleet tactics and maneuvers, fleet communications, rules of the nautical road, and relative movement problems.

NS 321,322,323. Naval Science III: Marine Corps Option.
3 hours each term. 5 ①
Evolution of Art of War and Modern Basic Strategy and Tactics: Art of war from Alexander to present; principles of modern strategy and small unit tactics. For U. S. Marine Corps candidates.

NS 411,412,413. Naval Science IV.
3 hours each term. 5 ①
Naval Weapons NS 411: Essentials of Weapons Systems. *Naval Management* NS 412, 413: Theory of management and the systems approach to naval management. Familiarization with the administrative techniques to be effective within the Navy management systems.

NS 421,422,423. Naval Science IV: Marine Corps Option.
3 hours each term. 5 ①
Amphibious Warfare and Administration: Theory of amphibious operations in World War II and Korean conflict; administration; leadership; and military justice. For U. S. Marine Corps candidates.

NS 450. Summer At-Sea Training.
6 hours summer.
Six- to eight-week training cruise taken aboard naval ships as arranged by professor of Naval Science.

* To be completed by end of junior year.

GRADUATE SCHOOL

COUNCIL AND COMMITTEES

EMERY N. CASTLE, Ph.D., Dean of the Graduate School.
WENDELL H. SLABAUGH, Ph.D., Associate Dean.
CARL E. BOND, Ph.D., Assistant Dean.
HENRY P. HANSEN, Ph.D., Dean Emeritus.
MARILYN SARFF, Secretary.

Graduate Council

E. N. Castle (chairman), A. E. Abrassart, R. Astro, C. E. Bond, A. G. Carey, W. R. Fielder, L. A. Gay, R. C. Petersen, D. J. Reed, W. H. Slabaugh, L. J. Weber, Elizabeth Yearick

Graduate Committees

Agriculture J. A. Edwards (chairman), A. P. Appleby, D. C. England, H. F. Horton, T. L. Willrich
Business and Technology A. E. Abrassart (chairman), C. M. Gudger, P. B. Schary, K. D. Walters, W. W. Widicus (ex officio)
Education W. R. Fielder (chairman), E. L. Anderson, G. E. Clark, E. W. Courtney, T. P. Evans, F. J. Gathercoal, A. L. Leeland, Berlan Lemon, J. J. Trow, W. L. Wycoff
Engineering J. G. Knudsen (chairman), J. R. Davis, C. E. Wicks, F. D. Schaumburg, R. R. Mohler, J. L. Riggs, J. B. Welty, B. I. Spinrad
Forestry W. K. Ferrell (chairman), J. H. Beuter, H. A. Froehlich, L. W. Gay, R. L. Krahmer, M. L. Laver, T. Stoffle (student)
Home Economics Elisabeth Yearick (chairman), Ruth Gates, Virginia Harger, Betty E. Hawthorne, Sylvia Lee, Martha Plong, Alan Sugawara
Liberal Arts G. B. Carson, History, L. E. Crisp, Speech Communication, W. R. Crooks (chairman), Psychology, W. K. Crozier, Art, T. C. Hogg, Anthropology, C. W. Hovland, Religious Studies, G. W. Sorenson, Economics
Oceanography C. A. Paulson (chairman), A. G. Carey, J. W. Hedgpeth, R. K. Johnson, P. D. Komar, J. E. McCauley, V. T. Neal
Pharmacy G. H. Constantine, R. F. Doerge, R. E. Johnson, R. E. Larson, R. W. Sager, C. O. Wilson
Science T. Moore (chairman), H. D. Brunk, C. Bayne, C. Fairchild, D. MacDonald, B. Spencer

ALL STUDY BEYOND THE BACHELOR'S DEGREE AT OREGON STATE UNIVERSITY is conducted through the Graduate School. The formulation of departmental graduate programs and the working out and direction of the programs of individual students are responsibilities of the departments, under the general rules and requirements of the Graduate School. The Graduate School also administers the institutional program for the encouragement of research by members of the faculty through the provision of necessary facilities and through grants-in-aid.

Organization and Administration. The Graduate Faculty consists of the President of the University, the academic deans, the chairmen of the departments in which advanced degrees are offered, and other members of the faculty who have been elected to the Graduate Faculty. Formulation of Graduate School policies is carried out by the Graduate Council, members of which represent their respective subject matter schools. Members of the Graduate Faculty are represented through their respective School Graduate Committes, which are made up of respresentatives from each of the several departments in the school. Members of the Graduate Faculty offer graduate courses, conduct seminars, serve on graduate committees, advise with students on their theses, and serve on preliminary and final examination committees. The Graduate Council meets on the second and fourth Thursdays of each month. The Dean of the Graduate School is chairman of the Graduate Council and an ex-officio member of all graduate committees.

History. Oregon State College granted its first advanced degrees (A.M.) in 1876. In 1897 residence requirements for the master's degree were announced. In 1910 graduate study was placed under a standing committee of the faculty. In 1933 all graduate work in the State System of Higher Education was placed in an interinstitutional Graduate Division; graduate work at Oregon State was placed under immediate charge of an associate dean and an institutional graduate council. The first degrees of Doctor of Philosophy were conferred by Oregon State in 1935. In October 1946, the State Board of Higher Education returned to the institutions direct responsibility for their programs of graduate study, and assigned graduate work on this campus to the Graduate School.

JOINT-CAMPUS PROGRAM

Regularly enrolled graduate students at Oregon State University may enroll in graduate courses of the University of Oregon in Eugene when these courses are a part of their approved graduate programs. The joint-campus program offers the graduate student enrolled at OSU access to the specialized instructional and research resources of two major universities through a single matriculation and registration.

In a similar manner, graduate students at the University of Oregon may take graduate courses at Oregon State University without additional tuition. Students participating in the joint-campus program are considered students of their home university.

Students follow the standard advising and registration procedures, irrespective of whether work is taken on one or both campuses. Courses to be taken at the University of Oregon will be identified on registration materials by the symbol "JC 510 UO" preceding the course prefix, number, and title as listed in the U of O catalog. Credit earned on either campus by OSU students will be recorded in the OSU Registrar's Office. Tuition and fees will be the same as if all courses were taken at Oregon State University. Students participating in this program are responsible for their own transportation.

CONCURRENT ENROLLMENT

Oregon State University students paying full tuition may enroll for courses through other colleges and universities of the Oregon State System of Higher Education at no additional cost in the concurrent enrollment program. Complete details of policies and procedures are available in the Registrar's Office.

ADVANCED DEGREES

The degrees granted through the Graduate School of Oregon State University and the fields in which programs of study leading to the respective degrees are offered are listed below.

Doctor of Philosophy (Ph.D.)

College of Science fields

ATMOSPHERIC SCIENCES: applied and dynamical mesometeorology, micrometeorology, synoptic meteorology

BIOCHEMISTRY AND BIOPHYSICS: biochemistry, biophysics

BOTANY AND PLANT PATHOLOGY: anatomy, cytology, ecology, fungus physiology, genetics, morphology, mycology, nematology, plant pathology, palynology, phycology, physiology, physiology of parasitism, plant virology, systematic botany, forest physiology, forest pathology

CHEMISTRY: analytical chemistry, inorganic chemistry, organic chemistry, physical chemistry, nuclear and radiation chemistry, radiochemistry

COMPUTER SCIENCE: artificial intelligence, computer architecture, numerical analysis, programming, theory of computation

ENTOMOLOGY: acarology, applied entomology, aquatic entomology, forest entomology, general entomology, systematic entomology

GENERAL SCIENCE: radiation biology, physical science, biological science, radiological physics, history of science

GENETICS: formal genetics, cytology and cytogenetics, evolution and speciation, quantitative genetics, microbial genetics, fungus genetics, plant genetics and improvement, animal genetics and improvement, forest genetics

GEOGRAPHY: physical and resource geography

GEOLOGY: areal geology, economic geology, geomorphology, invertebrate paleontology, micropaleontology, palynology, igneous and sedimentary petrology, sedimentology, stratigraphy, volcanology

MATHEMATICS: analysis, algebra, applied mathematics, geometry

MICROBIOLOGY: dairy microbiology, food microbiology, hygiene and sanitation, industrial microbiology, marine microbiology, microbial genetics, microbial physiology, microbiology of water and sewage, pathogenic microbiology, soil microbiology, virology, molecular biology

PHYSICS: atomic physics, nuclear physics, particle physics, solid state, theoretical physics

STATISTICS: applied statistics, biometry, mathematical statistics, operations research

ZOOLOGY: cellular biology, embryology and anatomy, genetics, invertebrate zoology, natural history and ecology, parasitology, physiology

School of Agriculture fields

AGRICULTURAL ECONOMICS: agricultural finance and taxation, agricultural marketing, agricultural policy, agricultural business management, community development, econometrics and mathematical economics, fisheries economics, human resource economics, international development, marine economics, natural resource development, price analysis, and production economics.

ANIMAL SCIENCE: genetics, meats, nutrition, physiology, rangeland resources, livestock management

AGRONOMIC CROP SCIENCE: crop breeding and genetics, crop physiology and ecology, crop production, genetics, pasture production and management, seed physiology, seed technology, weed control

FISHERIES: aquaculture, fish genetics, ichthyology, invertebrate fisheries, limnology, parasites and diseases, physiology and ecology of marine and freshwater fishes, toxicology, water pollution biology

FOOD SCIENCE AND TECHNOLOGY: food science, food technology, flavor chemistry, flavor evaluation, food microbiology, food toxicology, food proteins, food enzymology, food lipids, food pigments, food fermentation, and processing waste management

GENETICS: (See Colleges of Science fields on this page.)

HORTICULTURE: floriculture, nursery management, ornamental horticulture, pomology, vegetable crops

POULTRY SCIENCE: breeding, genetics, management, nutrition, reproduction physiology

SOIL SCIENCE: irrigation, forest soils, soil chemistry, soil fertility, soil genesis, soil physics, clay mineralogy, plant nutrition, soil classification, morphology, soil microbiology

WILDLIFE SCIENCE: wildlife management, behavior, food habits and nutrition, parasites and diseases, population dynamics, reproductive biology, toxicology of pesticides, wildlife ecology

School of Education fields

EDUCATION: education, counseling and guidance, college student services administration, vocational education

SCIENCE EDUCATION

School of Engineering fields

CHEMICAL ENGINEERING: chemical engineering

CIVIL ENGINEERING: highway engineering, hydraulic engineering, sanitary engineering, structural engineering, water resources engineering, ocean engineering, soil mechanics and foundation engineering, environmental engineering

ELECTRICAL AND COMPUTER ENGINEERING: communication, computers, control, digital systems, electrical engineering, electronics, instrumentation, medical electronics, network synthesis, power, solid state electronics

INDUSTRIAL ENGINEERING: engineering economics, human engineering, operations research and management, production control, program management, systems engineering, work design

MECHANICAL AND METALLURGICAL ENGINEERING: air sanitation, applied mechanics, automotive design, heat transfer, fluid mechanics, ocean engineering, thermodynamics, physical and mechanical metallurgy, metallurgical analysis and interpretation, materials science

NUCLEAR ENGINEERING: reactor engineering, nuclear fuel cycle engineering, nuclear power generation, nuclear reactor analysis, applied nucleonics

School of Forestry fields

FOREST ENGINEERING: forest hydrology

FOREST MANAGEMENT: fire control, forest economics, forest genetics, forest management, forest photogrammetry, forest tree physiology, resource economics, silviculture, forest biometry

FOREST PRODUCTS: wood science

School of Home Economics fields

FAMILY LIFE: child development, family relationships

FOODS AND NUTRITION: foods, nutrition

HOME MANAGEMENT: home management

School of Oceanography

OCEANOGRAPHY: biological, chemical, geological, and physical oceanography

GEOPHYSICS: geophysics

School of Pharmacy fields

PHARMACEUTICAL CHEMISTRY
PHARMACEUTICAL SCIENCE
PHARMACOGNOSY
PHARMACOLOGY

Doctor of Education (Ed.D)

School of Education fields

EDUCATION: education, counseling and guidance, college student services administration, vocational education
SCIENCE EDUCATION

Master of Arts (M.A.)

College of Science fields

ATMOSPHERIC SCIENCES
BIOCHEMISTRY AND BIOPHYSICS
BOTANY AND PLANT PATHOLOGY
CHEMISTRY
COMPUTER SCIENCE
ENTOMOLOGY
GENERAL SCIENCE: history of science, radiological health, radiological physics
GENETICS
GEOGRAPHY: Physical geography, resource geography
GEOLOGY
MATHEMATICS
MICROBIOLOGY
PHYSICS
STATISTICS
ZOOLOGY

School of Education fields

AGRICULTURAL EDUCATION
BUSINESS EDUCATION
EDUCATION
GUIDANCE
HEALTH EDUCATION
HOME ECONOMICS EDUCATION
INDUSTRIAL ARTS EDUCATION
REMEDIAL READING
SCIENCE EDUCATION

School of Engineering fields

AGRICULTURAL ENGINEERING
CHEMICAL ENGINEERING
CIVIL ENGINEERING
ELECTRICAL ENGINEERING
ENGINEERING SURVEYING
INDUSTRIAL ENGINEERING
MECHANICAL ENGINEERING
METALLURGICAL ENGINEERING
NUCLEAR ENGINEERING

School of Home Economics fields

CLOTHING, TEXTILES, AND RELATED ARTS
FAMILY LIFE
FOODS AND NUTRITION
HOME MANAGEMENT: housing, family economics

School of Oceanography

BIOLOGICAL OCEANOGRAPHY
CHEMICAL OCEANOGRAPHY
GEOLOGICAL OCEANOGRAPHY
PHYSICAL OCEANOGRAPHY
GEOPHYSICS
MARINE RESOURCE MANAGEMENT

School of Pharmacy fields

PHARMACEUTICAL CHEMISTRY
PHARMACEUTICAL SCIENCE
PHARMACOGNOSY
PHARMACOLOGY
PHARMACY ADMINISTRATION

Master of Science (M.S.)

The Master of Science degree is offered in the same fields as listed above for the Master of Arts degree with the following additions:

School of Agriculture fields

AGRICULTURAL ECONOMICS
ANIMAL SCIENCE: livestock management, dairy production, meats, wool technology
AGRONOMIC CROP SCIENCE
FISHERIES
FOOD SCIENCE AND TECHNOLOGY
GENETICS
HORTICULTURE
WILDLIFE SCIENCE
POULTRY SCIENCE
RANGE MANAGEMENT
SOIL SCIENCE
VETERINARY MEDICINE: pathology, microbiology, parasitology, virology

School of Business and Technology

BUSINESS ADMINISTRATION: management science

School of Forestry fields

FOREST ENGINEERING
FOREST MANAGEMENT
FOREST PRODUCTS

School of Home Economics

INSTITUTION MANAGEMENT

Other Master's Degrees

The following additional master's degrees are offered in the fields indicated:

Master of Agriculture: AGRICULTURE
Master of Arts in Interdisciplinary Studies
Master of Business Administration
Master of Education: ADULT EDUCATION, AGRICULTURAL EDUCATION, BUSINESS EDUCATION, EDUCATION, GUIDANCE, HEALTH EDUCATION, HOME ECONOMICS EDUCATION, INDUSTRIAL ARTS EDUCATION, REMEDIAL READING, SCIENCE EDUCATION, VOCATIONAL EDUCATION
Master of Forestry: FOREST ENGINEERING, FOREST MANAGEMENT, FOREST PRODUCTS
Master of Home Economics: CLOTHING, TEXTILES, AND RELATED ARTS; FAMILY LIFE; FOODS AND NUTRITION; GENERAL HOME ECONOMICS; HOME ECONOMICS EDUCATION; HOME MANAGEMENT
Master of Materials Science
Master of Ocean Engineering
Master of Pharmacy: PHARMACY ADMINISTRATION, HOSPITAL PHARMACY

Engineer Degrees

Degree	*Department*
Agricultural Engineer (A.E.)	Agricultural Engineering
Chemical Engineer (Ch.E.)	Chemical Engineering
Civil Engineer (C.E.)	Civil Engineering
Electrical Engineer (E.E.)	Electrical Engineering
Industrial Engineer (I.E.)	Industrial Engineering
Mechanical Engineer (M.E.)	Mechanical and Nuclear Engineering
Metallurgical Engineer (Met.E.)	Metallurgical Engineering
Nuclear Engineer (N.E.)	Mechanical and Nuclear Engineering

Minors

Any of the fields listed above may be offered as minor fields of study as a part of a student's graduate study program. In addition graduate minors in the following fields are also offered.

Agricultural Engineering Technology
Air Pollution
Anthropology
Art
College and University Teaching
Community Health
Economic Geography
Economics
English
Extension Methods
History
Modern Languages
Music
Philosophy
Physical Education
Political Science
Psychology
Resource Recreation Management
Sociology
Speech
Trade and Industrial Education
Water Resources

GENERAL REGULATIONS

Admission

A student desiring to enter the Graduate School at Oregon State University will send (or arrange to have sent) to the Office of Admissions: (1) admission forms; (2) a transcript of all his previous college or university work; (3) a letter indicating the special fields in which he is particularly interested or a statement that he does not wish to become a candidate for a degree; (4) a non-refundable $10 application fee, and (5) two letters of reference. The applicant should contact the major department for any special requirements such as GRE scores. To be considered for admission to the Graduate School, an applicant much have a baccalaureate degree from an accredited college or university, and a scholastic record and background and other evidence that indicate he is capable of doing satisfactory graduate work. The Admissions Office will determine whether the general conditions for admission have been met. The major and minor departments indicated by the student will examine the material submitted to determine adequacy of scholastic background and to decide whether departmental facilities are adequate for the expressed aims of the student. The recommendations of the department are reviewed by the Graduate Office. The student is then notified by the Office of Admissions as to the action taken.

Admission Status

Students may be admitted to the Graduate School under the following categories:

Regular Graduate students

Those who have met the academic requirements may be either classified or unclassified.

a. *Classified* are those who have been accepted by a major department to work toward an advanced degree.

b. *Unclassified* are those who have graduated from an accredited institution but have not declared a major, or those who want to work toward certification for teaching or other professional work. These students may become classified candidates later, if accepted by a department.

Conditionally Accepted Graduate Students

a. *Provisional graduate students.*

(1) Students from nonaccredited institutions must complete at least one term of satisfactory work at Oregon State, after which they may be admitted with full standing in the Graduate School and allowed graduate credit for courses they have completed acceptably while registered as provisional students.

(2) Students whose preparation does not warrant full admission to the Graduate School but who may prove acceptable later. If at the end of two quarters of work they fail to show promise as graduate students they will be asked to terminate their work.

Post-Baccalaureate Status

A student who holds a baccalaureate degree and desires to work toward (1) a second baccalaureate degree or (2) teacher certification but not for an advanced degree will be classified as a *post-baccalaureate student.* He must apply through the Admissions Office and the Graduate School Office and have approval of the department of his major. If he desires teacher certification, he must have approval of the School of Education.

A post-baccalaureate student may be able to reserve some graduate credit to apply later on an advanced degree. It must be in courses taken in addition to those required for baccalaureate degrees. Grades in courses reserved must be B or better. No more than 18 hours of credit may be reserved in this way.

A post-baccalaureate student is not eligible to hold an appointment as a teaching assistant or research assistant. He may elect to take undergraduate courses on an S-U basis, except for courses required for removal of deficiencies and undergraduate courses in the 400 series carrying (g) or (G).

If he desires to become a candidate for an advanced degree, he may request the Graduate School to reclassify him as a regular graduate student. He must have completed at least 24 hours of credit with a grade of B or better as a post-baccalaureate student. Normally, he may apply no more than 12 hours of credit in courses in which he has earned a grade of B or better to his advanced degree program. Exception to this rule may be in cases in which his advanced degree program includes additional courses that he has taken as a post-graduate student. His application to transfer from post-baccalaureate to regular graduate students status must be approved by the Director of Admissions, the department in which a second baccalaureate degree or teacher certification is being sought, and the department in which the advanced degree is to be sought.

Special Student status

A student who holds a baccaulaureate degree may be classified as a *special student* (1) if he does not wish to become a candidate for an advanced degree or (2) if he does not meet the requirements for admission to the Graduate School.

If he can satisfy requirements for admission to the Graduate School, he may be considered at any time for status as a regular graduate student. If he cannot satisfy these requirements, he must complete 24 hours of graduate work with a grade-point average of 3.00 or better before being considered for status as a regular graduate student.

He may apply up to 12 hours of graduate credit taken as a special student on an advanced degree program, but they must not be hours taken to qualify for admission to the Graduate School and must be approved by his graduate committee.

Dismissal from Graduate School

1. *Classified* and *provisional* students who have been reviewed by the major department and asked to terminate their work because of failure to meet the academic requirements of that department will be dismissed from the Graduate School. Review of the case by a subcommittee of the Graduate Council may be requested by the student involved.
2. *Unclassified students* who fail to attain a grade-point average of at least 3.00 after two terms of graduate work may be subject to review by a subcommittee of the Graduate Council and possible dismissal.

Students who fail their final oral examinations will be dismissed from the Graduate School.

Test of English as a Foreign Language (TOEFL)

This test is required of all foreign applicants whose native language is not English, with a minimal score of 500.

Reserving Credits

Graduate credit is not granted for undergraduate courses taken in excess of the requirements for a baccalaureate degree, but undergraduate students taking graduate courses in excess of baccalaureate requirements may have such credits reserved for possible future use under the following conditions:

(a) Only credits with A or B grades, earned within 45 hours (60 hours for five-year baccalaureate programs) of graduation, may be reserved for graduate credit.

(b) Request for reservation must be made early in the term in which the student completes baccalaureate requirements.

(c) A maximum of 18 hours may be reserved for graduate credit.

(d) Courses reserved for graduate credit should be selected with the help of a graduate adviser in order to insure that they will be appropriate for a graduate program.

(e) A minimum of two terms of residence in the Graduate School is required regardless of the number of credits reserved.

Preparation Required

Preparation for a graduate major must be an undergraduate major in the same subject or a fair equivalent. Preparation for a graduate minor must be at least one year of upper division work in addition to foundation courses in the subject.

Qualifying Examinations

Graduate students working for advanced degrees in many departments are required to take an examination in their major and minor fields designed to determine their overall preparation and background. This examination is in effect a guidance examination, the results of which are used in setting up the graduate study program. Poor showing in any of the areas tested may result in the student's taking undergraduate courses without credit to give him the necessary background to go on with his graduate program.

The examination may be oral or written, or both, and must be taken during the first term of his graduate enrollment, preferably before the beginning of fall term, but not later than one month after the beginning of the term. In lieu of their own qualifying examination, departments may accept a satisfactory showing in the Graduate Record Examination or some other standard test.

A graduate of OSU who has maintained a grade-point average in major and minor fields of at least 3.25 throughout his undergraduate work may be exempted from taking the qualifying examination. A student working toward the doctoral degree who has received his master's degree at Oregon State not more than three years before beginning doctoral work is not required to take the qualifying examinations unless his major has been changed. He is required, however, to take examinations in additional minors.

Term Credit Load

The maximum load for a graduate student devoting all of his time to graduate study is 16 hours (17 hours on petition). For teaching and research assistants, the maximum load is 12 term hours; for part-time assistants the maximum load is 15 hours and the minimum load is 9 term hours; fellows may carry the maximum load. A minimum load of 9 term hours may qualify for purposes of Veteran's benefits, Selective Service, visa requirements, etc.

A graduate student using space and facilities or under supervision of a major professor must register for a minimum of 3 term hours, including the term in which oral examinations are taken.

The graduate program of each candidate should include a substantial amount of work with at least three faculty members offering graduate instruction.

Grade Requirement

A grade-point average of 3.00 (a B average) is required in both the major and the minor(s). Grades below C are not accepted for graduate credit.

Graduate Courses

All courses numbered in the 500's carry graduate credit, as do those in the 400's which have been approved by the Graduate Council. Approved courses in the 400's are designated in the catalog by (G) or (g) following the course title. Courses designated (G) may form a part of either a major or minor; one course designated (g) may be taken toward a major. Blanket numbers 501, 503, 505, 506, 507 and 508 may be repeated to the maximum as indicated below. Number 503 covers both the thesis research and the writing. Although thesis credit may be registered each term, the thesis grade is not given until the dissertation is presented at the final oral examination. Number 501 is for research which is not part of the thesis and data obtained from such research should not be incorporated in the thesis. Reading and Conference (505) and Projects (506) are used for special work not given under a formal course number. They may include specified reading, laboratory work, field work, or compilation of information essential in the student's program. The work done under these numbers may be reported either in writing or orally to the instructor concerned. Seminar (507) is used both for departmental seminars and for special group work not given in a formal course. A maximum of 6 hours of blanket numbers other than thesis, or research in lieu of thesis for non-thesis degrees, may be used on the Master's degree program and 15 hours on the doctorate.

S-U Graded Courses

Courses designated exclusively as S-U may be taken by graduate students, but do not carry graduate credit. Graduate students may not elect to take courses on an S-U basis. See Academic Regulation 18 in the *Schedule of Classes*.

Oral Examination Schedule

Oral examinations, both preliminary and final, may be scheduled during any period when classes are in session. This excludes the periods between the regularly scheduled terms.

Petitions

A student who wishes to deviate from the normal graduate school regulations and procedures may present his problem in a letter addressed to the Graduate Council signed by himself and his major professor. The student will be advised of the Council's decision. Action taken on petitions will not be considered as a precedent for any future action.

Application for Degree

Students expecting to complete requirements for advanced degrees should apply for graduation at the Graduate School Office by the first week of spring term preceding Commencement.

Students who complete degree requirements in the summer term should apply for graduation at the Graduate School Office by the end of the fourth week of the summer term. Diplomas will be mailed during the fall term.

Graduate Fees

Graduate students registered for 9 term hours of work or more pay tuition and fees in accordance with the schedule printed in the General Information section of this Catalog. Graduate students do not pay the nonresident fee. Students holding teaching or research assistantships pay fees totaling $45 per term. Graduate students registering for 8 hours of work or less (minimum three credit hours) pay the graduate part-time fee. Payment of the fee entitles the student to all services maintained by Oregon State for the benefit of students.

Deposits. Persons who enroll for academic credit (except staff members) must make a deposit of $25 payable once each year at the time of first registration. This is required as a protection against loss or damage of institutional property such as dormitory equipment, laboratory equipment, military uniforms, library books, locker keys. If at any time charges against this deposit become excessive, the student may be called upon to reestablish the original amount.

Microfilming. All doctoral candidates pay a fee of $20 for microfilming of the doctoral dissertation.

Graduate Work by Staff Members

Staff members of Oregon State University holding rank above that of instructor cannot receive advanced degrees from Oregon State University. Full-time staff members may register normally for not more than 3 hours per term. As many as 5 hours may be permitted provided registration is not for more than one course. Approval for registration must be obtained from the Executive Office.

GRADUATE APPOINTMENTS

A varying number of graduate teaching and research assistantships are awarded annually to graduates of accredited universities and colleges who have superior records in their undergraduate work. All persons holding these appointments are expected to register in the Graduate School and to become candidates for advanced degrees. Graduate assistants render service to the institution through teaching duties or research and pay fees amounting to $40.50 per term, which admit them to all services maintained by the University for the benefit of students. Graduate assistants may carry a maximum of 12 hours and a minimum of 9 hours per term.

Teaching Assistantships. A teaching assistant renders services amounting to not more than 15 hours a week—reading papers, handling laboratory and quiz sections, etc. He is permitted to enroll for a maximum of 12 hours per term. The stipend for a graduate assistant varies from $2,400 to $3,600.

Research Assistantships. A research assistant aids a faculty member in carrying on a research project. Compensation and enrollment limitations are the same as for a teaching assistant.

Agricultural Experiment Station Graduate Research Assistantships. Appointees are usually required to devote the equivalent of one-half time on approved Experiment Station projects. Appointment and stipend are based on training, ability, and experience. The stipend varies from $3,648 to $4,329 on a twelve-month basis.

Oregon Cooperative Wildlife Research Unit Assistantships and *Oregon Cooperative Fishery Unit Assistantships.* Available in wildlife ecology and in fisheries with emphasis on fish genetics. Stipends for 12 months range from $3,468 to $4,968. Apply to Department of Fisheries and Wildlife.

Engineering Experiment Station Assistantships. A variable number of assistantships are available through the Engineering Experiment Station under which the student devotes one-third of his time as an assistant on an approved station project. Such projects are in operation in each department of engineering except engineering physics, agricultural engineering, and manufacturing engineering technology. The current stipend is $2,800 to $3,100 for nine months.

Sea Grant College Graduate Research Assistantships. A number of research assistantships in marine fields are provided by the Sea Grant College Program through the participating academic departments. Application for assistantships should be directed to appropriate departments, which are listed in the description of the Sea Grant College on page 194 of this bulletin.

Student Services Assistantships. Appointees receive stipends from $1,800 to $4,800, depending on the level of experience and the number of hours of work required weekly. Assistantships are available in the following areas: Residence halls, Housing Office, College Union, Student Activities, Counseling Center, Financial Aid, International Education, and Office of the Dean of Students. Students usually are permitted to enroll for a maximum of 12 hours of credit per term, but half-time positions limit the student to 10 hours.

Fellowships. A number of Fellowships sponsored by industry, foundations, and government agencies are available to superior graduate students for graduate study in various departments at Oregon State University. These fellowships are awarded through the departments concerned, and application should be made by writing to the department. Fellows render no service to the institution, may carry 16 term hours, and pay full tuition. The following fellowships are open to Oregon State University graduate students:

AMOCO PRODUCTION FOUNDATION FELLOWSHIP: $3,600 to graduate students in oceanography for geophysical or geological research on the continental shelf of the Pacific Coast.

JOHN LIND CHING MEMORIAL FELLOWSHIP: Two $500 graduate fellowships, provided by the Dr. Kim K. Ching Family, to support research and study in forestry.

DOW CHEMICAL COMPANY FELLOWSHIP: $2,500 provided by the Dow Chemical Company for graduate fellowships in chemical engineering; a senior may be selected.

DUPONT GRANT: Annual awards up to $2,500 to assist graduate students in chemical engineering.

ERIC ENGLUND MEMORIAL POST-GRADUATE SCHOLORSHIP: One or two annual $2,000 scholarships for graduate study in agricultural economics or home economics. Graduates of any Oregon State University degree program are eligible to apply.

GENERAL FOODS FUND FELLOWSHIPS: Two grants for doctorate or master's degree study in any area of Home Economics; $3,500 for two years for candidate on doctoral program and $1,750 for a student on a master's degree program, provided by the General Foods Fund, Inc. of New York City.

JOHNSON RESEARCH FELLOWSHIP: Income from a trust fund left by the late Robert Johnson, placed with First National Bank of Portland, to graduate student for study, research, and investigation in agricultural economics and allied fields. Approximately $5,500 annually.

MARY J. L. MCDONALD FELLOWSHIPS IN FORESTRY: Annual grants of $300 to $1,500 each to assist graduate students in forestry.

SHELL AIDS IN CHEMICAL ENGINEERING: $5,000 for the advancement of graduate education in chemical engineering.

SHELL AIDS IN CHEMISTRY: $5,000 for the advancement of graduate education in chemistry.

SOUTH SANTIAM EDUCATIONAL RESEARCH PROJECT FELLOWSHIPS: A number of $600 to $1,200 fellowships to be added to assistantships for students in forestry provided by the Louis W. and Maud Hill Foundation.

STAUFFER CHEMICAL COMPANY GRANT: Annual awards up to $2,500 to assist graduate students in chemical engineering.

TEXACO FELLOWSHIP: $3,000 plus tuition for graduate study in oceanography in petroleum technology.

U. S. BUREAU OF MINES RESEARCH FELLOWSHIPS: Stipends in chemistry, physics, geology, and engineering for research at the Albany, Oregon, plant. Master's degree candidates devote one year to research, doctoral candidates two years. Compensation based on up to 50% of GS-5 and GS-7 pay. Fellows may carry the normal fellowship load of classwork.

CHESTER M. WILCOX MEMORIAL SCHOLARSHIP: Income from a trust fund left by A. D. Wilcox in honor of his brother to two graduate students for research in poultry science. Approximately $5,500 annually.

RESEARCH GRANTS: Various departments of the College of Science and other research organizations on the campus, including the Engineering Experiment Station and Agricultural Experiment Station, annually receive grants from Federal and State agencies, foundations, and private companies for research projects. Many include stipends for graduate students. Application made through department concerned.

DEGREE PROGRAMS

Master of Arts and Master of Science

Credit Requirement

For the departmental Master of Arts or Master of Science degree, the student must complete a program of study totaling not less than 45 term hours including thesis and courses approved for graduate credit. Approximately two-thirds of the work (30 term hours) must be in the major and one-third (15 term hours) in the minor. No correspondence credits may be included. Of the 45 term hours, a maximum of 6 term hours may be earned under "in absentia" registration, but no thesis credit may be thus registered. A single small "g" course is allowed on the major.

Residence Requirements

The residence requirement for the M.A. and M.S. degrees is one academic year or fair equivalent. A maximum of 15 term hours earned in graduate courses in the Division of Continuing Education of the Oregon State System of Higher Education or at the University of Oregon may be counted as credit earned in residence toward the departmental master's degree.

Transferred Credit

A maximum of 15 term hours of graduate work done at another accredited institution, or in the Division of Continuing Education of the Oregon State System of Higher Education, may be transferred, provided that: (1) the work fits into a logical program for the degree; (2) the transfer is approved by the department and by the Graduate Council; (3) grades of A or B have been earned. Credit granted for work done at another institution is tentative until validated by work in residence. Credit for out-of-state extension courses is not acceptable.

Language Requirements

For the Master of Arts degree, the student must show, by examination or by adequate undergraduate courses (not less than two years), a reading knowledge of one foreign language, preferably French or German. By petition to the Graduate Council, *before* any language examination is taken, a student may be permitted to substitute another language, if it is equally relevant to his program of graduate studies. A candidate for a master's degree who passes the regular reading-knowledge examination need not repeat such examination if he proceeds toward his doctorate within a reasonable time. For a Master of Science degree there is no foreign-language requirement, unless a language is needed in the individual student's program.

Grade Transcripts

Students who complete graduate courses through the Division of Continuing Education must make arrangements to have transcripts of their grades sent to the Graduate School Office at Oregon State University. Students expecting to complete degree requirements for the June Commencement must have transcripts in the Graduate Office not later than two weeks before Commencement. Students expecting to complete degree requirements during the regular summer term and to receive diplomas in September, must have their transcripts in the Graduate Office not later than two weeks before the end of the regular eight-week summer term.

Graduate Study Program

As soon as feasible a study program for the master's degree should be filed in the Graduate Office. The program is worked out under the guidance of the major and minor professors, entered on the card for that purpose, and signed by the major and minor professors and the chairman of the school graduate committee before filing in the Graduate Office. The master's degree program should be filed during the first term of the student's residence. The program for a master's degree may not contain courses already included in another master's degree program for which a degree has been or will be awarded.

Time Limit

All work counted toward the master's degree (including work for which credit is transferred from another institution, the thesis, and the final examination) should be completed within a period of five years, but work taken between five and eight years before the program is completed may be validated under the supervision of the department, usually by assigned readings or examination or both. Courses more than eight years old are obsolete.

Qualifying Examination. (See page 185.)

Thesis

A copy of the master's thesis in final form must be presented to the Graduate Office at least one week prior to the final oral examination. Copies of the thesis and abstract are then distributed to members of the examining committee. After the examination, two copies for the library and three copies of the abstract are deposited unbound in the Graduate Office. The student must obtain on the thesis approval page the signatures of the major professor, the head of the major department, and the Dean of the Graduate School.

Full information concerning the prescribed style for thesis is given in the booklet, "Preparation of the Thesis," available at the Book Store for thirty-five cents.

The credit allowed for the thesis, including the research and the preparation of the manuscript, varies from 6 to 12 term hours. In certain departments, the thesis requirement for the Master of Science and Master of Arts degrees is optional, to be determined in each case by the department and major professor. Check with the major department.

Final Examinations

A final oral examination is required of every candidate for the master's degree; when deemed desirable a written examination may also be required. When a thesis is involved, the examination may not be less than two hours duration and the examining committee consists of at least four members of the faculty, two in the major field, one in the minor field, and a graduate council representative. When no thesis is involved, the final oral examination may not be less than one hour in duration and the examining committee consists of three members of the faculty. One dissenting vote is permitted for both thesis and non-thesis degrees. The final oral examination must be scheduled in the Graduate School Office not less than one week prior to the date of the examination.

Final oral examinations must be scheduled in the Graduate Office five weeks before June Commencement and must be completed four weeks before Commencement. Corrected copies of the thesis with three copies of the abstract must be in the Graduate School Office not later than three weeks before Commencement.

The examining committee is nominated by the student's adviser, subject to the approval of the Dean of the Graduate School, who is ex-officio a member of all examining committees.

Other Master's Degrees

Master of Agriculture

The program for the Master of Agriculture degree provides a broader training in several fields for high-school agriculture teachers, veterans' instructors, extension workers, and other professional agricultural workers who do not desire the specialized training of the departmental degree and theses based on research. Forty-five hours are required with a minimum of 9 hours in each of at least three agricultural or agriculturally related fields with not more than 21 hours in any one field. At least 15 hours must be in 400 (G) or 500 courses.

An advisory committee selected from these departments will select the major professor from the department of the student's major interest. The program must be approved by

the committee within three weeks from the date the student registers under the program. No thesis is required but a paper demanding 3 to 5 hours of work must be submitted to be registered as Reading and Conference 505 in the field of major interest. A final oral examination is required.

Master of Arts in Interdisciplinary Studies

This degree is granted for the attainment of a broad advanced knowledge and cultural achievement rather than for work in a specialized field under the traditional program of the departmental master's degree. A minimum of 9 hours in each of three departments (at least one of which must be in a field in which graduate majors are allocated to the institution) is required, with not more than 21 hours in any one department. The course work must be integrated and organic. A final oral examination is required.

Option A. Thesis option. The thesis of 6-9 term hours must coordinate the work in the three fields.

Option B. No thesis is required, but a paper of 4-7 hours of credit is required. This must be registered as Research or Reading and Conference in Interdisciplinary Studies or in the department of major interest.

Master of Business Administration

The Master of Business Administration degree is designed for the individual holding an undergraduate degree either in business administration or in a nonbusiness area who seeks professional education which will aid him ultimately to develop into a competent and responsible executive in business, industry, or government, or to carry on research related to business problems and operations. The program involves a broad study of the field of business administration rather than intensive work in any one specialized area.

The M.B.A. program consists of 45 term hours of graduate work, 15 of which may be devoted to a nonbusiness minor. Prerequisite to the MBA graduate courses is a body of undergraduate work in business and economics totaling 40 to 45 term hours.

The time required by a full-time student to complete the program varies from one to two years, depending upon the extent to which the prerequisites are met prior to admission. M.B.A. candidates whose undergraduate degrees were earned in business administration normally will be able to complete the requirements for the M.B.A. degree within one year.

The M.B.A. degree requires a comprehensive final written examination but no thesis is required.

Master of Education

The Master of Education is a professional degree for which a minimum of 45 term hours in graduate courses must be completed. Additional hours may be required depending on the needs and the undergraduate preparation of the candidate, or according to the requirements of divisions or departments within the School of Education. A minimum of 57 hours is required for recommendation for a master's degree or certification at the professional level in guidance and counseling. Fifty-four hours are required for the master's degree in college student personnel administration. Provision is made for earning credit through the Division of Continuing Education of the State System of Higher Education but a minimum of 24 term hours (not to include thesis or field studies) must be earned on the Corvallis campus in two complete eight- or eleven-week summer terms or two academic-year terms. Additional on-campus hours are required in those programs in which the minimum program consists of more than 45 hours.

Credit for extension courses from outside the State System of Higher Education is not accepted except under unusual circumstances. In instances where it is accepted, *prior approval* must be obtained from the Dean of the Graduate School if such courses are to be submitted for program purposes. Where credit is transferred from another institution and the major is education or guidance, at least 12 term hours must be earned in the major on this campus. Where the minor is in education, administration, or guidance, at least 12 term hours must be earned in the minor on this campus. When the major *and* minor are in education or guidance, a minimum of 12 term hours in each must be earned on this campus. A maximum of 6 hours of Workshop 508 is allowed on the Ed.M. degree.

A candidate for the Master of Education degree must qualify under one of these options:

a. He must submit a thesis, which meets all standards for a master's thesis, on some applied or professional aspect of education. For the thesis he receives 6 term hours of credit.

b. He majors in guidance and completes 41 hours of prescribed courses and 16 hours of electives—no more than 9 hours in any one field—drawn from the fields of anthropology, philosophy, psychology, sociology, family life, and those education courses relating to guidance.

c. He completes 45 term hours with 24 term hours in specific courses. The remaining 21 hours are elective under the direction of an adviser. No thesis or field studies are required. The final examination will be either oral or a written comprehensive examination covering all courses in the student's program. Under Option C are offered industrial arts education, business education, and health education majors which deviate from the requirements above in that they consist of a minimum of 30 hours in the respective fields with a minor of 15 hours in general education integrated around Research Procedures in Education or Diagnostic and Remedial Instruction in Reading and a sequence of not less than 9 hours in administration, guidance and counseling, or curriculum construction. In each case a minimum of 45 hours is required.

d. For remedial reading, he completes 45 term hours in specific courses in reading, special education, and psychology. Options are available to prepare reading specialists at the elementary, secondary, and community college levels. The remaining 9 hours are elective under the direction of an adviser. No thesis is required, but there are both written and oral final examinations.

Master of Engineering

This degree is applicable only to those engaged in authorized off-campus graduate instruction. A minimum of 45 term hours is required, divided into approximately 30 hours for a major and 15 hours for a minor or minors. Included for a variable number of hours within the major will be a formal report in lieu of thesis, the scope and content of the report to be by approval of the major professor. Prerequisite to study for the degree will be a degree from an undergraduate curriculum in engineering and admission to the Graduate School. The general requirements for the degree are the same as for the Master of Science except for those related to the thesis and for the formal report.

Master of Forestry

The professional Master of Forestry degree is intended for potential administrators and technologists in public and private organizations where men of broad ability are demanded and a broader technical training is needed. At least 21 hours are to be selected within a major field of forestry, and as many as 24 hours may be elected from other departments in the School of Forestry or from other related fields outside of forestry. The electives must contribute to a unified program which will meet the specific objective of the student. A thesis is not required under this plan, but at least two technical reports, correlated with courses in the major fields or assigned or approved topics, must be submitted. A final oral examination is required.

Master of Home Economics

The Master of Home Economics is a professional degree which may be of interest primarily to high-school teachers and extension personnel. A major is offered in general home economics and also in each department of the School of Home Eco-

nomics. A minor is required, to be selected from offerings in the School of Home Economics or from other schools and departments according to the student's needs.

A thesis is not required but at least one written report requiring reading, analysis, criticism, and organization of material shall be prepared and submitted to the Graduate Council and then filed with the department or departments concerned.

General requirements, except for those relating to the thesis and written report, are the same as for the Master of Science degree. A final oral examination is required.

Master of Materials Science

Graduate study in material science is organized on an interdepartmental basis under the direction of an Administrative Committee. The departments of Chemical Engineering, Chemistry, Mechanical Engineering, and Physics cooperate in the program. A minimum of 45 term hours is required for the degree distributed approximately 30 hours to a major including thesis, and 15 hours to a minor or minors. A final oral examination is required.

Master of Ocean Engineering

The Master of Ocean Engineering is an interdisciplinary program offered in cooperation with the School of Oceanography and other disciplines which may relate to ocean science. The program requires 45 term hours and is administered by an interdepartmental School of Engineering Committee with a major in one of the engineering disciplines and usually a minor in oceanography. A student may be admitted to one of the engineering departments, and a study program is designed to fit the individual's professional objectives and to achieve a high degree of engineering competence pertinent to the ocean environment. A final oral examination is required.

Master of Pharmacy

The Master of Pharmacy is offered with majors in pharmacy administration and hospital pharmacy. A thesis is optional for either major. A final oral examination is required.

Engineer

For the degrees of Agricultural Engineer, Chemical Engineer, Civil Engineer, Electrical Engineer, Industrial Engineer, Mechanical Engineer, Nuclear Engineer, and Metallurgical Engineer, the candidate must meet one of the following sets of requirements:

a. Those who hold a baccalaureate or master's degree from Oregon State University must have at least five years of successful professional practice following graduation. Graduate study, through the Division of Continuing Education or otherwise, may be substituted for professional practice to a maximum of three years, and at the approximate rate of 12 term hours of graduate credit in lieu of each year of professional practice. No thesis credit will be permitted in such substitution, but the candidate must present a satisfactory thesis upon a subject of his professional experience and compatible with the designation of the degree.

b. Those who do not hold baccalaureate or master's degrees from Oregon State University are subject to the same requirements as (a) with the additional stipulation that at least 12 term hours of graduate work must be completed in an Oregon State program.

In both cases, on or before January 1 of the academic year in which the degree is desired, the candidate submits to the chairman of the appropriate department a complete statement of his professional experience and graduate academic credit since receipt of his last degree. Accompanying the statement should be a thesis title and sufficient description or outline of thesis content to provide a basis of evaluation. After the statement has been approved by the chairman of the department, the School Graduate Committee, and the Graduate Council, the candidate is instructed to prepare and submit his thesis. The thesis must be of high order and is subject to the same scrutiny and regulations as other graduate theses. Upon acceptance of the thesis, the candidate is recommended for the degree in the usual manner. The candidate applies for the degree with the Registrar of Oregon State University either in person or by mail not later than March 1.

Doctor of Philosophy

General Requirements

The degree of Doctor of Philosophy is granted primarily for attainments and proved ability. There is no rigid credit requirement; however, the equivalent of at least three years of full-time graduate work beyond the bachelor's degree is required. Normally, a student who has had all of his undergraduate and graduate training at Oregon State may not become a candidate for a doctoral degree at this institution.

Graduate Study Program

The student's doctoral study program is formulated and approved at a formal meeting of his doctoral committee which consists of a minimum of five members of the graduate faculty, including a representative of the Graduate Council appointed by the Graduate Dean. The other members of the doctoral committe are approved by the major department or interdepartmental committee and the Graduate Dean. If a minor is declared, the representative is approved by the minor department. When approved by the doctoral committee, the program is filed with the Graduate School Office, and it becomes the obligation of the student to complete the requirements as formulated. In order to modify the program in any way, the student must obtain approval for such changes in the same manner approval of the original program was secured.

Residence

For the doctor's degree, the equivalent of at least three years of full-time work beyond the bachelor's degree is required, of which at least one academic year (usually the last) must be spent in continuous residence at Oregon State University. A minimum of 36 hours of graduate work is required in residence.

Qualifying Examinations. (See page 185.)

Language Requirements

The foreign language requirement is determined by the student's doctoral committee, subject to the same approval required for the graduate study program, and is so designated on the official doctoral program. However, in order to have completion of French, German, Spanish, or Russian indicated officially on the transcript, a student must pass the Graduate Student Foreign Language Test formulated by the Educational Testing Service. Foreign language requirements must be completed before the oral preliminary examination.

Preliminary Examinations

The student working toward the doctor's degree must pass a group of comprehensive preliminary examinations (at least partly oral) in his major and minor subjects not less than two terms before he takes the final examination. Advancement to candidacy is contingent on passing these preliminary examinations. If more than one negative vote is recorded by the examining committee, the candidate will have failed the examination. Most departments require a written comprehensive examination to be taken before the oral preliminary examination. Oral preliminary examinations must be scheduled in the Graduate Office one week in advance, and may not be taken during the period between eight and three weeks before June Commencement.

Thesis

Every candidate for the degree of Doctor of Philosophy must submit a thesis embodying the results of research, and giving evidence of originality and ability in independent investigation. The thesis must be a real contribution to knowledge,

based on the candidate's own investigation. It must show a mastery of the literature of the subject, and be written in creditable literary form. The preparation of an acceptable dissertation will require not less than one academic year. The booklet, "Preparation of the Thesis," is available at the Book Store. Credit for the doctoral thesis ranges from 25 to 45 hours.

Regulations concerning the doctoral dissertation are the same as those for the master's degree, as outlined on a previous page, except that the final draft must be presented to the Graduate Office at least *two weeks* prior to final examination.

An abstract of the doctoral thesis of not more than six hundred words will be published by University Microfilms in *Dissertation Abstracts*. Candidates for the Doctor of Philosophy and Doctor of Education degrees pay a fee of $20 for microfilming of the thesis in its entirety by the University Microfilms and publication of the abstract in *Dissertation Abstracts*. Deadline for completing these arrangements is no later than three weeks before Commencement.

Final Examination

The final examination for the degree of Doctor of Philosophy may be written in part, but must include an oral examination. The oral examination is open to all members of the faculty and to advanced graduate students. The examining committee consists of the student's doctoral committee and any additional members, including competent professors from other institutions, whom the major department may appoint. In the oral examination, the candidate is expected to defend his thesis and to show a satisfactory knowledge of his field. If more than one negative vote is recorded by the examining committee, the candidate will have failed the examination.

The final oral examination must be taken within five years after the preliminary examination. If more than five years elapse, the candidate will be required to take another preliminary examination.

Final oral examinations must be scheduled in the Graduate Office not less than one week in advance. During the spring term, the final oral must be scheduled not later than *six weeks before June Commencement* and must be *completed about four weeks before Commencement*. Exact dates will be publicized. Two final and complete copies of the dissertation with three copies of the abstract must be in the Graduate School office not later than *three weeks* before Commencement. Oral preliminary examinations may not be taken during the period from eight to three weeks before Commencement.

Doctor of Education

Programs of study for the Doctor of Education (Ed.D.) degree emphasize applied studies in education, based on scholarly and research literature, which identify, analyze, and resolve issues and problems in elementary, secondary, and higher education. Such programs help students prepare for positions in supervision, curriculum development, classroom teaching, or administration in a public school, college, or university.

All candidates for the Ed.D. degree must have a master's degree or equivalent preparation. They must meet the requirements for admission to the University, the Graduate School, and the School of Education. They must have had the experience indicated below in their major field, and must satisfy requirements for residence, preliminary and final examinations, and dissertation similar to those for the Doctor of Philosophy degree.

Candidates must complete a major of not less than 45 hours of course work in one of the fields listed below. They must submit a dissertation (about 25 hours) involving a research study or an approved field study in their area of specialization. They must complete a first minor and a second minor as outlined below and include Ed 512 and St 451 or equivalent in their programs.

Major Fields

College Student Services Administration. Candidate must have had at least two years of paid experience in college student services or in college teaching or working with young adults.

Education (with emphasis on elementary, secondary, or community college curriculum and instruction). Candidate must have had at least two years of successful, paid, full-time teaching experience in the general area of emphasis.

Counseling and Guidance. Candidate must have had at least two years of successful, paid, full-time teaching experience and at least two years of paid counseling experience.

Science Education. Candidate must have had at least two years of successful, paid, full-time teaching experience in area of emphasis.

Vocational Education. Candidate must have had at least two years of successful teaching or other appropriate experience in the general area of emphasis.

First Minor

The first minor must include at least 36 hours. It may be in one of the major fields listed above; in Adult Education, Agricultural Education, Business Education, Health Education, Home Economics Education, Industrial Education, or Remedial Reading; or, with the approval of the School of Education's Graduate Studies Committee, it may be in a substantive field outside of the School.

Second Minor

The second minor must include not less than 30 hours of credit in a substantive field outside of the School of Education.

SPECIAL GRADUATE SCHOOL PROGRAMS

The following special and interdepartmental programs are offered by the Graduate School of Oregon State University. Courses and degrees which apply specifically to these programs are listed here rather than in other sections of this catalog.

COLLEGE TEACHING MINOR

STANLEY E. WILLIAMSON, coordinator
G. F. CRAVEN, H. L. FROSS, J. K. MUNFORD

Studies in College and University Teaching and Curriculum

Many persons who qualify for master's and doctor's degrees engage in college and university teaching as part of their professional work. The Graduate School prepares students for college and university teaching as well as for research. It offers a group of courses dealing with the philosophy, functions, and structure of higher education and problems of teaching, curriculum development, and student-faculty relationships. In all these courses, students have opportunity to delve into topics of special interest.

Maturity, background, and sincerity of purpose are the principal requisites. There are no course prerequisites in professional education. The program is not planned to fulfill requirements for a teaching credential in any state, although it may be supplemented with additional work to serve this purpose.

Graduate Minor in College Teaching. A minor in college and university teaching (15-18 term hours for a master's degree, 21-24 term hours for a doctor's degree) may be taken in conjunction with a subject-matter major. The core program, all of which is required for the teaching minor for a master's degree, consists of The College Student (CC 556), College and University Teaching (CC 557), American Higher Education (CC 558), College Teaching Procedures Seminar (.... 507), and College Teaching Studies (CC 506).

For doctoral candidates, additional electives are chosen in appropriate areas to form an integrated program in college teaching.

Studies in Teaching and Curriculum. Studies or projects in curriculum development and improvement of teaching may be engaged in by individuals or faculty groups. Graduate students are encouraged to join these studies since the association of college teachers with students interested in curriculum and teaching is of mutual advantage.

Graduate Courses

CC 505. **Reading and Conference.** Terms and hours to be arranged.

CC 506. **College Teaching Studies.** 3 hours any term.
Reading, conference, and preparation of written reports related to, but distinct from, a teaching assignment at college level. Ordinarily no credit is given for the teaching itself. Open to graduate students who have teaching assignments concurrent with the course. Special arrangements may be made for those who have already taught in college or university. Prerequisite: CC 556,557,558.

CC 507. **Seminar.** Terms and hours to be arranged.

..... 507. **Seminar (College Teaching Procedures).** 3 hours.
Student registers for this seminar in his major department and meets during the term with students from other fields and the instructor to study teaching procedures applicable at the college level.

CC 508. **Workshop.** Terms and hours to be arranged.

CC 509. **College Curriculum Studies.** Terms and hours to be arranged.
Joint study with staff assistance in any aspect of college curriculum, including problems of teaching, guidance, and coordination. Seminar or workshop procedures are used according to aims of group.

CC 556. **The College Student.** 3 hours. 3 ①
Student as central factor in college and university teaching; hereditary background, physical environment, cultural environment, and group relationships as contributors to his maturation; learning as nurture; motivation and direction of college student's learning. Prerequisite: graduate standing.

CC 557. **College and University Teaching.** 3 hours. 3 ①
Evaluation, aims, procedures, and outcomes in college and university teaching; professional relationships and interests; individual studies according to student's field. Prerequisite: graduate standing.

CC 558. **American Higher Education.** 3 hours. 3 ①
The American college and university; the old liberal arts college; influence of German university; rise of American university; structure and curriculum; international higher education. Prerequisite: graduate standing.

INTERDISCIPLINARY STUDIES

The General Studies program at Oregon State University is supervised by Assistant Dean Carl Bond of the Graduate School. In addition to courses chosen from the offerings of the several schools and departments, the following courses are available for the general studies student. The thesis requirement for the Master of Arts degree is optional.

Graduate Courses

ISt 501. **Research.** Terms and hours to be arranged.

ISt 503. **Thesis.** Terms and hours to be arranged.

ISt 505. **Reading and Conference.** Terms and hours to be arranged.

GENETICS

RALPH BOGART, Director of Genetics Institute

Genetics Board: R. BOGART, K. L. CHAMBERS, K. K. CHING, J. A. HARPER, D. S. NACHTWEY, L. PARKS, MAXINE THOMPSON.

Graduate work in Genetics as a major or a minor can lead to the degrees of Master of Arts, Master of Science, and Doctor of Philosophy. Graduate studies in genetics are coordinated by the Genetics Board and the Director of the Genetics Institute, representing the genetics graduate faculty who are attached to many departments in the Schools of Agriculture, Forestry, and Science.

In addition to the specific courses carrying a Genetics (Gen) number, graduate courses in formal genetics, cytology and cytogenetics, evolution and speciation, quantitative genetics, microbial genetics, plant genetics and improvement, animal genetics and improvement, and forest genetics are offered in various departments.

The following undergraduate courses in genetics are offered: Genetics (Bi 341), Plant Breeding (ACS 415), Horticultural Plant Breeding (Hort 413), Poultry Breeding (P 441).

Graduate Courses

Gen 501. **Research.** Terms and hours to be arranged.

Gen 503. **Thesis.** Terms and hours to be arranged.

Gen 505. **Reading and Conference.** Terms and hours to be arranged.

Gen 507. **Seminar.** Terms and hours to be arranged.

NUTRITION

Advisory Board: G. H. Arscott, R. R. Becker, P. R. Elliker, Clara A. Storvick, I. J. Tinsley, P. D. Whanger, Margy J. Woodburn.

An interdisciplinary graduate program leading to the M.S. or Ph.D. degree in Nutrition is available under the direction of the Nutrition Research Institute. Current research programs within which a major may conduct his research appropriate to his thesis include studies in the areas of amino acid, carbohydrate, lipid, and mineral metabolism, nutrient interrelationships, nutrient requirements, and nutritional imbalances. Facilities are available for studies on man, animals, and plants.

Graduate Courses

Nu 501. **Research.** Terms and hours to be arranged.

Nu 503. **Thesis.** Terms and hours to be arranged.

Nu 505. **Reading and Conference.** Terms and hours to be arranged.

Nu 507. **Seminar.** Terms and hours to be arranged.

GRADUATE WORK AT LOS ALAMOS AND RICHLAND

Arrangements have been made whereby a very restricted number of students may complete theses for the Ph.D. degree at Los Alamos, New Mexico.

Oregon State University is one of three northwestern universities cooperating with the University of Washington Joint Center for Graduate Study which is located in Richland, Washington. Qualified employees of Battelle Northwest and other contractors at the Hanford Atomic Products Operation may earn graduate credits toward advanced degrees at Oregon State University.

In addition to the departmental majors, a major in nuclear engineering will be offered. The minimum residence requirement at Corvallis is one term for a master's degree and two terms for a doctor's degree.

The studies pursued at Richland vary for different students and fields but are subject to approval in each case by the Graduate Council. A plan is followed whereby the course number 509 is used, preceded by the appropriate departmental designation, followed by the name "Richland Studies" with the title of the particular study placed in parentheses.

Graduate Courses

CE 509. **Richland Studies.** Terms and hours to be arranged.

Ch 509. **Richland Studies.** Terms and hours to be arranged.

ChE 509. **Richland Studies.** Terms and hours to be arranged.

EE 509. **Richland Studies.** Terms and hours to be arranged.

GS 509. **Richland Studies.** Terms and hours to be arranged.

ME 509. **Richland Studies.** Terms and hours to be arranged.

MetE 509. **Richland Studies.** Terms and hours to be arranged.

Mth 509. **Richland Studies.** Terms and hours to be arranged.

NE 509. **Richland Studies.** Terms and hours to be arranged.

Ph 509. **Richland Studies.** Terms and hours to be arranged.

RESEARCH

ROY A. YOUNG, Ph.D., Vice President for Research and Graduate Studies
WAYNE V. BURT, Ph.D., Associate Dean of Research
J. RALPH SHAY, Ph.D., Assistant Dean of Research
RICHARD ASTRO, Ph.D., Assistant to the Vice President for Research

ADVANCEMENT OF HUMAN KNOWLEDGE and providing technical and technological services to the commonwealth are recognized functions of institutions of higher education. Research to advance human knowledge is encouraged and assisted at Oregon State University by general and directed research funds and is conducted by separately organized agencies. It is supported by appropriations to experiment stations, institutes, and centers; by grants from private and public agencies for institutional and individual projects; and by instructional budgets as part of normal academic activity.

The General Research Fund is administered by the Graduate Council. The Directed Research Fund and institutional grants from the National Science Foundation (NSF) and Public Health Service (PHS) are administered with the advice of the Research Council.

Separately organized research agencies include the following:

Agricultural Experiment Station
Engineering Experiment Station
Sea Grant College Program
Office of Energy Research and Development

Research Centers

Air Resources Center
Computer Center
Environmental Health Sciences Center
International Plant Protection Center
Marine Science Center
Radiation Center
Survey Research Center
Western Region Area Development Research Center

Research Institutes

Genetics Institute
Institute of Nuclear Science and Engineering
Nutrition Research Institute
Water Resources Research Institute

Laboratories

Environmental Remote Sensing Applications Laboratory
Forest Research Laboratory

The Vice President for Research and Graduate Studies coordinates efforts of the various research organizations of the University. He encourages and assists faculty members in the development of research programs and in handling of grant applications. He advises the President of the University regarding general progress of the institution's research programs. He works in close association with the Dean of the Graduate School to insure maximum opportunity for the integration of graduation instruction and research. With the advice of the Research Council, he recommends allocation of NSF grants and other general research funds. He coordinates administration of grant and contract operations with the Director of Business Affairs to facilitate the work of research personnel and to insure compliance with the regulations of granting agencies.

Directed Research

Directed research funds are appropriated to provide staff on instructional appointments in the College of Science and the School of Engineering increased opportunity to initiate research programs. Funds are used for staff salary to provide for released time from teaching, usually for one term of the academic year. Details can be obtained from the office of the Vice President for Research and Graduate Studies.

General Research

General research includes faculty research, especially of a fundamental nature, that does not fall into the organized and directed programs of other research agencies. The Graduate Council prepares and submits annually a budget for the support of general research and is authorized to receive, examine, and act upon requests for grants-in-aid from funds allowed.

Applications are received from individual staff members, or groups, of the rank of instructor or higher. Grants-in-aid are awarded for problems that give promise of results of general significance to learning. Grants may be used for equipment, certain supplies, and wages.

Grants are not intended to provide data for theses leading to advanced degrees, or subject matter for a specific course, or information of restricted though useful nature for administrative functions. Each recipient of a grant is required to present a written progress report to the Dean of the Graduate School on June 1 each year. Projects may be renewed for several years.

NSF and PHS Institutional Grants

The National Science Foundation, since July 1960, has awarded an institutional grant annually to OSU. The primary purpose of the grant is to strengthen the general research functions in mathematical, physical, biological, social, and engineering sciences as *defined by NSF*. These funds may be used to employ research staff, purchase research equipment, support visiting research specialists, and conduct other research-related activities.

A similar institutional grant program was initiated by the Public Health Service in 1966 for support of *health-related* research and training. It is recommended by the PHS that the institutional grant be used to meet emerging opportunities in research, to explore new and unorthodox ideas, to recognize and support scientific talent earlier and, in general to utilize funds flexibly and in ways that will be catalytic both for improving and for fostering additional *health research* consistent with broader academic objectives. This grant complements rather than displacing other PHS awards and supplements institutional funds already devoted to health-related research or research training.

Faculty members may submit applications to the Research Council for support from institutional grants at any time.

Agricultural Experiment Station

G. Burton Wood, Ph.D., Associate Dean and Director.
Wilson Hoover Foote, Ph.D., Associate Director.
Robert Wesley Henderson, Ph.D., Assistant Director.
David Paul Moore, Ph.D., Assistant Director.
Agricultural Chemistry: Professor Freed (department head)
Agricultural Economics: Professor Eisgruber (department head)
Agricultural Engineering: Professor Davis (department head)
Agronomic Crop Science: Professor Cowan (department head)
Animal Science: Professor Oldfield (department head)
Botany and Plant Pathology: Professor T. Moore (department head)
Entomology: Professor Oman (department head)
Fisheries and Wildlife: Professor Warren (acting dept. head)
Food Science and Technology: Professor Kifer (department head)
Home Economics Research: Professor Hawthorne (acting department head)
Horticulture: Professor Weiser (department head)
Microbiology: Professor Elliker (department head)
Poultry Science: Professor Arscott (department head)
Publications: Assistant Professor Floyd
Soil Science: Professor Cheney (department head)
Statistics: Professor Calvin (department head)
Veterinary Medicine: Professor Wedman (department head)
Branch Experiment Stations: Professors Lombard, Mellenthin, Raleigh, Rohde; Associate Professors Hoffman, M. Johnson, Martin; Assistant Professors Carter, Davidson, Vavra

The Oregon Agricultural Experiment Station was organized July 1, 1888, in accordance with the Hatch Act of 1887. It now includes a central station at Corvallis and nine branch stations so located as to cover the varying agricultural conditions of Oregon.

The Station serves as the principal agricultural research agency in the State. Its mission is to contribute through research in the agricultural, biological, environmental, and social sciences: (1) to insure a stable and productive agriculture through wise management of the natural resources of the State; (2) to protect crops and animals from insects, diseases, and other hazards, and to improve the efficiency of agricultural production; (3) to develop new and improved agricultural products and processes and enhance product quality; (4) to strengthen and improve the marketing of Oregon's agricultural products; (5) to protect the consumer and improve the nutrition and well-being of the people of the State; (6) to promote community development and economic and public services for both rural and urban people of Oregon; and (7) to protect and improve the environment and quality of living.

The Station conducts research in the following departments: Agricultural Chemistry, Agricultural Economics, Agricultural Engineering, Agronomic Crop Science, Animal Science, Botany and Plant Pathology, Entomology, Fisheries and Wildlife, Food Science and Technology, Home Economics, Horticulture, Microbiology, Poultry Science, Rangeland Resources, Soil Science, Statistics, and Veterinary Medicine. The Branch Stations are Central Oregon (Redmond), Eastern Oregon (Union), Klamath (Klamath Falls), Malheur (Ontario), Mid-Columbia (Hood River), North Willamette (Aurora), Columbia Basin Research Center (Pendleton), Southern Oregon (Medford), and Squaw Butte (Burns). The Station also maintains permanent field units or laboratories at Newport for marine sciences, at Astoria for seafood processing, and at Brooking for lily bulb production.

The Station cooperates with the U.S. Department of Agriculture, U.S. Department of Interior, and other Federal and State agencies on research programs of interest to the State and Nation.

Engineering Experiment Station

Fredrick Joseph Burgess, M.S., Dean, School of Engineering, and Director, Engineering Experiment Station.

James George Knudsen, Ph.D., Associate Dean, School of Engineering, in charge, Engineering Experiment Station.

Engineering School Graduate Committee: J. G. Knudsen (chairman), J. R. Davis, R. R. Mohler, J. L. Riggs, F. D. Schaumburg, B. J. Spinrad, S. A. Stone, J. R. Welty, C. E. Wicks.

By act of the Board of Regents of Oregon State College on May 4, 1927, the Engineering Experiment Station was established at Corvallis to serve the State in a manner broadly outlined by the following policy:

To serve the industries, utilities, professional engineers, public departments, and engineering teachers by making investigations of significance and interest to them.

To stimulate and elevate engineering education by developing the research spirit in faculty and students.

To publish and distribute through bulletins, circulars, and technical articles in periodicals the results of such studies, surveys, tests, investigations, and research as will be of greatest benefit to the people of Oregon, and particularly to the State's industries, utilities, and professional engineers.

The Engineering Experiment Station is an integral part of the School of Engineering. All staff members and laboratory facilities of the Engineering School are available for the investigative work of the station to the extent of funds allocated or contributed for this purpose. Much of the work of the Station has been made possible by the assistance of industries and state and national associations. Inquiries concerning cooperative projects are welcomed.

The dean of engineering is the director of the Engineering Experiment Station and guides the operation of the Station to conform with state and institutional policies. The associate dean is chairman of the Engineering School Research and Graduate Committee, acts as administrator in charge of the Engineering Experiment Station, and is technical editor of publications. The active staff is composed of members of the instructional staff who may be interested in various specific research projects, or of research assistants who are pursuing graduate study and are assigned to part-time work in the Station.

Sea Grant College Program

William Q. Wick, Director

Daniel A. Panshin, Assistant Director

Executive Committee:
John V. Byrne, Dean, School of Oceanography
Emery N. Castle, Dean of the Graduate School
Joseph R. Cox, Director, Extension Service
James G. Knudsen, Director Engineering Experiment Station
C. David McIntire, Associate Professor of Botany
Charles E. Warren, Acting Head, Department of Fisheries and Wildlife
Roy A. Young, Vice President for Research and Graduate Studies

The Oregon State University Sea Grant College Program is supported by a grant from the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce, and is funded through a combination of federal and state appropriations and by contributions from industry and local government. The program involves research, education

and training, and advisory and extension activities in three major program divisions: Food from the Sea, Coastal Zone Environment, and Human Resources.

Within the divisions, major programs are conducted in aquaculture, fish and shellfish diseases, biological resources, exploitation of stocks, marine product development, coastal management, estuarine management, professional and technical education, public policy analysis, and marine advisory programs. Multi- and inter-disciplinary in focus, the Sea Grant College Program involves faculty and students in the College of Liberal Arts, College of Science, School of Agriculture, School of Engineering, School of Oceanography, and the School of Pharmacy. Participants in the Program also include the Law School at the University of Oregon and the Marine Technology Department at Clatsop Community College.

Through the OSU Sea Grant College Program, the university's resources are applied to the solution of ocean problems—as identified by the users of Oregon's marine resources. A 12-member Sea Grant Advisory Council, composed of Oregon marine industry leaders, provides continuing external review of program emphasis and progress. An Executive Committee, comprised of senior administrators, performs a similar role internal to the University.

Although major portions of the Sea Grant College Program are conducted on the main campus in Corvallis (Oregon State University), Eugene (University of Oregon), and Astoria (Clatsop Community College), several research centers on the Oregon coast provide facilities. These include the OSU Marine Science Center in Newport, the Seafoods Laboratory in Astoria, and the Netarts Bay Fisheries Culture Station.

Office of Energy Research and Development

JAMES G. KNUDSEN, Professor of Chemical Engineering, Associate Dean of Engineering, Director.

The Office of Energy Research and Development was established in January 1974 to coordinate research, training, and service activities related to the conservation of energy and to the development of new energy sources. The office is advised by a faculty steering committee which works with the Director in the development of programs and functions and in communicating information on energy programs to faculty in their respective disciplines and schools, and by an advisory committee consisting of representation from industry, government, the general public, and the University. The office will: Work with interested faculty to develop disciplinary and interdisciplinary research and training programs, identify programs for which funding is available and attempt to seek out funding for proposals developed by the faculty, assemble pertinent information on energy research and development and disseminate this information to the public, and serve as a center for interaction between the University and federal and state agencies, industry, and the general public on energy problems and programs.

RESEARCH CENTERS

Air Resources Center

ROBERT M. ALEXANDER, Director

WILLIAM H. BUCKLEY, Executive Secretary

Advisory Committee

RICHARD W. BOUBEL, Professor of Mechanical Engineering; VIRGIL H. FREED, Head, Department of Agricultural Chemistry and Director, Environmental Health Sciences Center; E. WENDELL HEWSON, Chairman, Department of Atmospheric Sciences; R. M. KALLANDER, Assistant Dean, School of Forestry; J. RALPH SHAY, Department of Botany and Plant Pathology.

The Air Resources Center provides for a comprehensive multidisciplinary approach to the identification of atmospheric pollution problems and contributes to their solution by bringing together qualified scientists in the atmospheric sciences, agricultural and biological sciences, chemistry, engineering, forestry, biometrics, economics, political science, and other social sciences.

The Center facilitates the development and coordination of programs for (1) research on air resource problems, (2) training graduate students in disciplines related to air resources, (3) training technicians in air pollution control technology in a joint effort with the Oregon Institute of Technology and (4) short courses, seminars, and intensive post-graduate instruction offered as short term institutes for industry and government personnel concerned with aspects of air pollution abatement and control.

Major efforts are devoted to air pollution problems that are unique to, or of major importance in, the Pacific Northwest. Among these are air pollution problems resulting from field burning, forest waste disposal, and effluents from manufacturing activities such as aluminum plants and the pulp and paper industry. These are matters of some urgency in western Oregon where the pollution potential is high because of surface and meteorological conditions.

The Air Resources Center also serves as a source of information for state and regional air pollution control agencies, for industry, and for the general public. Close coordination is maintained with the Oregon Department of Environmental Quality and three regional authorities: Columbia Willamette, Mid-Willamette, and Lane Regional.

Computer Center

L. C. HUNTER, Ph.D., Professor, Director.

T. L. YATES, M.S., Associate Professor, Manager, Administrative Systems.

G. D. ROSE, M.S., Research Associate, Assistant to Director, Consultant, Operating Systems Development and Computer Graphics.

T. R. BRANTNER, B.S., Research Associate, Assistant to Director, Manager of Business Affairs.

J. D. BALLANCE, M.S., Research Assistant, Manager, Operating Systems Development.

J. W. FRYKLUND, M.S., Research Associate, Manager of On-line Hardware and Software Systems Development.

R. A. DAVIS, B.S., Research Associate, Manager of Operations and Applications Programming.

Assistant Professor: J. DAVIS.

Instructors: BACHELOR, BRENNE.

Research Associates: BAUGHMAN, MURRAY, PORTER, SCHEURMAN, THOENNES.

The Computer Center provides a focal point for computer-related activities on campus. Its functions include computational services, scientific consulting services, support of computer science programs and instruction in computers, and research basic to computers and computer systems. Administrative, computer

based systems are also a key function of the Center. Developments in this latter area include computer assisted registration, on-line systems for admissions processing, faculty and staff personnal records, library acquisitions, and student health center billing.

The principal computer of the Center is a Control Data 3300. The CDC 3300 operates under OS-3, a time-sharing system designed and developed by the Computer Center. A network of more than 200 remote computer consoles has been installed on the OSU campus and at other colleges in Oregon to make facilities more readily accessible to users. These consoles permit direct access to the Control Data 3300 computer. Several smaller computers are available for the support of instructional and research programs. A research computer, NEBULA, has been constructed under the sponsorship of the Office of Naval Research. A Calma Company Digitizer is available for the conversion of data from analog graphical form to digital form on magnetic tape.

The Computer Center provides, in addition to computational facilities, mathematical and statistical consulting services for the formulation and analysis of problems and for considerations for new computer systems. A variety of instructional materials including video tapes have been prepared to assist students, faculty, and others to acquire an understanding of computers and a facility with the many specialized programs and languages available.

Faculty members associated with the Center are engaged in research and development activities in computer science and in use of computer systems, including projects in numerical methods of computation, programming systems and conversational languages, automata theory, computer organization, file-based systems, and instrumentation for computers and computer systems.

Environmental Health Sciences Center

V. H. FREED, Ph.D., Director.

I. J. TINSLEY, Ph.D., Associate Director

J. M. WITT, Ph.D., Executive Secretary.

EXECUTIVE COMMITTEE: R. W. Newburgh, L. D. Calvin, C. E. Warren, W. R. Crooks, J. D. Lattin, R. M. Alexander, F. D. Schaumburg, E. M. Castle, E. E. Wedman

The Environmental Health Sciences Center was established in 1967 as an organizational unit under the Vice President for Research and Graduate Studies to provide coordination and stimulation of environmental health training and research.

The problem of environmental quality and its effect on human welfare is becoming increasingly complex as both our population and technology expand. The ultimate solution to environmental problems requires strong, coordinated, interdisciplinary efforts from many subject matter areas, both to develop persons qualified in this field and to generate new knowledge.

The Environmental Health Sciences Center brings together research workers, advisers, faculty affiliates, and teachers from many departments with a wide variety of professional capabilities, including: chemistry, biochemistry, toxicology, nuclear chemistry, biology, entomology, agronomy, botany, food science, fisheries and wildlife, veterinary medicine, pharmacology, ecology, psychology, mathematics, economics, engineering, humanities and social sciences.

The broad mission of the Center is to facilitate and encourage research, training, and support of qualified graduate students; sponsor conferences, symposia, and meetings for both student training and public communication; and to serve as an interdisciplinary resource group to state and local governmental agencies and society at large on problems relating to man's health and well-being and the management of the environment.

Examples of specific areas of interest include toxicology of environmental microchemical pollutants, movement of chemicals in the environment, utilization of solid waste products, chemical waste disposal, environmental engineering, and mathematical modeling of environmental problems.

The Environmental Health Sciences Center is interested not only in research and public service, but in the training of qualified professional people in this field. Accordingly, the Environmental Health Sciences Center offers traineeships for support of graduate students interested in preparing for a career in environmental health sciences. The student will normally major in one of the traditional subject matter departments and augment this training with courses designed to give him both understanding and perspective. Such courses have been developed through the cooperation of subject matter departments and the Center.

The administrative office of the Center is located in Weniger Hall; however, the research facilities are a part of and are located in the various cooperating departments.

International Plant Protection Center

S. F. MILLER, Ph.D., Director

ADVISORY COMMITTEE: J. R. Cowan, L. M. Eisgruber, G. B. Wood

The International Plant Protection Center was established in 1969 to increase the capability of Oregon State University to develop and administer effective plant protection programs in developing countries. At the same time, the program serves to improve teaching, research, and extension capabilities in plant protection within the University.

Principal programs to date have been in the development and evaluation of weed control systems. They have involved primarily the Departments of Agronomic Crop Science and Agricultural Economics with additional support from several other departments and are administered by the Agricultural Experiment Station. Operations of the Center involve not only close coordination with the University, but also with the Federal Government, the United Nations, industrial companies, and various foundations, all of which are involved in agricultural assistance programs in developing countries.

Marine Science Center

Newport, Oregon

JOHN V. BYRNE, Ph.D., Acting Director.
CHARLES E. WARREN, Ph.D., Acting Associate Director.

R. G. REDMOND, Port Captain
PROFESSORS: J. V. Byrne, J. Fryer, J. W. Hedgpeth, H. K. Phinney, A. W. Pritchard, C. E. Warren
ASSOCIATE PROFESSORS: W. P. Breese, G. E. Davis, K. S. Hilderbrand, C. D. McIntire, L. F. Small
ASSISTANT PROFESSORS: R. S. Caldwell, J. J. Gonor, J. E. Lannan
INSTRUCTORS: D. E. Giles, V. J. Osis
RESEARCH ASSOCIATE: R. E. Olson

The Marine Science Center is situated on a 49-acre site in Newport adjacent to Yaquina Bay and one mile from the Pacific Ocean. The facility is operated by the University to serve the general public and the staff of OSU, sister institutions, and cooperating State and Federal agencies. The University encourages all workers in the marine sciences whose research, instruction, or extension activities require a coastal site to use the Center facilities.

Main buildings provide 38,000 square feet of office and fresh and salt water laboratory area and include a public auditorium, aquarium, and museum. Smaller buildings house offices and laboratories of the Fish Commission of Oregon and the Oregon Wildlife Commission, as well as ship support facilities of the OSU School of Oceanography. Dock areas accommodate the OSU ships *Yaquina*, *Cayuse*, *Chinook*, and *Paiute*, and smaller boats from several agencies. There are dormitories for up to twenty-six students and visiting staff members.

Research projects currently involve more than 100 staff members from the School of Oceanography, the Departments of Botany, Fisheries and Wildlife, Microbiology, Oceanography, and Zoology and the OSU Extension Service, and from the Environmental Protection Agency, Fish Commission of Oregon, and Oregon Wildlife Commission. The instruction program focuses on marine biological aspects of tidal, estuarine, and nearshore marine environments, subjects for which the Center's location provides a natural laboratory. Extension work concentrates on programs of interest to the general public and to the coastal fishing industry. Much of the research and extension work of the OSU Sea Grant College program is conducted at the Marine Science Center.

The public area serves about one-quarter million visitors, including more than ten thousand elementary and high school students, annually.

Potential users of Center facilities are invited to write to the Director, outlining their needs.

Radiation Center

CHIH H. WANG, Ph.D., Director

The Radiation Center is a campus-wide research and training facility designed to accommodate programs involving the use of radioisotopes and radiation. Housed in the Center are major nuclear and radiation devices, including a TRIGA-II research nuclear reactor (licensed to be operated at 1,000 Kw steady-power level and 2,600 Megawatts in the pulsing mode), an AGN-201 training nuclear reactor, a 3,300 curie cobalt-60 source, a 300 kVp x-ray generator, a number of multichannel analyzers and associated detectors, a 14 Mev neutron generator, neutron diffraction apparatus, neutron radiography facility, and a variety of instruments for radiation measurement and monitoring. Special facilities include laboratories for large and small animal experiments and plant experiments.

Staff members of the Radiation Center receive joint appointments in the Center and the appropriate academic departments. The center staff provide services such as consultation on the feasibility of design and execution of radioisotope and radiation experiments; hazard evaluation of experiments or devices involving use of radioisotopes or other ionizing radiation; nuclear engineering; nuclear power plants; radiation chemistry; neutron activation analysis; neutron radiography; neutron diffraction experiments; radiation effects on biological systems; radiation dosimetry; production of short-lived radioisotopes; nuclear shielding, and problems of nuclear instrumentation and radioactive-waste disposal.

The center laboratories and instruments are available to all campus research workers and instruction programs requiring such facilities.

Survey Research Center

LYLE D. CALVIN, Ph.D., Director

CHARLES D. COWAN, M.A., Manager

G. DAVID FAULKENBERRY, Ph.D., Study Director

ROBERT G. MASON, Ph.D., Study Director

Advisory Committee

J. ROY BARDSLEY, President, Bardsley and Haslacher

A. FRITZ BARTSCH, Director, National Environmental Research Center

KESSLER CANNON, Director, Department of Environmental Quality

G. BURTON WOOD, Director, Agricultural Experiment Station

The Survey Research Center, established in 1973, operates both as a service center to conduct surveys for other agencies and organizations, and as a center for research on survey methodology. Activities range from advice on surveys to the handling of all parts of the survey, including survey design, sample selection, questionnaire construction, personal interviewing, mail questionnaires, editing and coding, data processing and analysis, and writing of reports for dissemination of results.

The Center is available to departments of the Oregon State System of Higher Education, to state and federal agencies, and to organizations serving the public interest. Charges are made for all work in the Center. Estimates for project proposals can be obtained upon request. For proposals to be submitted to funding agencies, the Center can either submit a joint proposal or act as a subcontractor.

Although the primary interest in the Center is in surveys of human populations, other populations of interest include biological populations of plants and animals, land areas, transportation, and other populations for which surveys can provide useful information.

Western Region Area Development Research Center

HARLAND I. PADFIELD, Ph.D., Director

RESEARCH SCIENTISTS: Joe B. Stevens, Associate Professor, Agricultural Economics; John A. Young, Research Associate, Anthropology; Frank J. Javorek, Research Associate, Social Psychology

This Center, supported largely by funds from the Agricultural Experiment Station, has a high priority function in conducting interdisciplinary research on problems of rural development, largely social and behavioral science oriented. Geographically, it covers the thirteen Western states, including Hawaii. Research results are expected to be of value to workers in rural communities and to policy makers at the state and national level. It is also anticipated that the Center will have a training and extension component.

RESEARCH INSTITUTES

Genetics Institute

RALPH BOGART, Ph.D., Director.

PROFESSOR EMERITUS: W. A. Frazier
PROFESSORS: J. Baggett, P. E. Bernier, K. L. Chambers, K. K. Ching, J. R. Cowan, E. J. Dornfeld, D. C. England, W. H. Foote, R. V. Frakes, J. A. Harper, W. S. Overton, L. W. Parks, P. Roberts, W. E. Sandine, J. R. Shay, R. C. Simon, R. M. Storm, C. H. Wang, T. M. Ching, W. E. Kronstad, G. S. Beaudreau

ASSOCIATE PROFESSORS: Robert Campbell, D. L. Copes, Peter Dawson, Alfred Haunold, R. J. Metzger, H. Irgens-Moller, D. S. Nachtwey, A. Owczarzak, R. R. Silen, F. C. Sorenson, F. M. Stout, Maxine M. Thompson, Kenneth Rowe

ASSISTANT PROFESSORS: Lyle Brown, Francis Lawrence, W. D. Hohenboken, D. L. Stamp, Norbert Hartmann, G. D. Pearson, J. D. McIntyre

RESEARCH ASSOCIATE: Mary McCoy Powelson

INSTRUCTOR: Edward Thompson

Established in 1964, the Genetics Institute serves to integrate the research activities in genetics carried on by personnel in the biological science departments of the University. The function of the Institute is to strengthen genetics as a unifying discipline for biology, biochemistry, and biophysics. The Genetics Institute is administered by a director, assisted by an elected Genetics Board. The Institute staff comprises some 33 geneticists from the several departments in the Schools of Agriculture, Forestry, and Science.

Extensive facilities for genetics research are provided by the departments with which the geneticists are affiliated. Active research is under way in the following areas: formal genetics, molecular and biochemical genetics, radiation genetics, cytology and cytogenetics, evolution and speciation, quantitative genetics, microbial and fungal genetics, plant genetics and improvement, animal genetics and improvement, and forest genetics. These facilities and the competent faculty provide outstanding opportunities for graduate teaching and research.

Nuclear Science and Engineering Institute

CHIH H. WANG, Ph.D., Director

PROFESSORS: A. W. Anderson, Ralph Bogart, Malcolm Daniels, H. T. Easterday, H. J. Evans, S. C. Fang, D. J. Kimeldorf, S. E. Knapp, J. G. Knudsen, V. A. Madsen, D. B. Nicodemus, T. H. Norris, J. E. Oldfield, O. G. Paasche, D. J. Reed, Roman Schmitt, R. O. Sinnhuber, B. I. Spinrad, T. D. Thomas, E. D. Trout, D. L. Willis

ASSOCIATE PROFESSORS: J. P. Barton, D. R. Buhler, Peter Fessenden, R. R. Michael, D. S. Nachtwey, J. C. Ringle, A. H. Robinson, L. W. Swenson

ASSISTANT PROFESSORS: S. E. Binney, K. Hornyik, A. G. Johnson, Walter Loveland

This Institute functions as a coordination body on curricular matters at the graduate and undergraduate levels in nuclear science and engineering and implements fellowship programs, graduate training programs, short-course programs, research programs, and seminar programs that are not managed by individual departments and are interdisciplinary in nature. It was established in 1966.

Nutrition Research Institute

DIRECTOR: (To be appointed)
PROFESSORS EMERITUS O. C. Compton, E. M. Dickinson, M. L. Fincke, J. R. Haag, H. M. Krueger, O. H. Muth, C. A. Storvick, G. Tank
PROFESSORS: R. H. Alvarado, A. F. Anglemier, G. H. Arscott, G. S. Beaudreau, R. R. Becker, W. G. Brown, D. O. Chilcote, D. C. Church, M. D. Dawson, P. R. Elliker, H. J. Evans, V. H. Freed, Ralph Garren, B. E. Hawthorne, T. L. Jackson, D. P. Moore, J. E. Oldfield, R. G. Petersen, K. S. Pilcher, A. T. Ralston, W. E. Sandine, H. W. Schultz, R. O. Sinnhuber, L. C. Terriere, I. J. Tinsley, S. L. Wagner, C. H. Wang, P. H. Weswig, G. B. Wood, M. J. Woodburn, E. S. Yearick
ASSOCIATE PROFESSORS: D. R. Buhler, D. L. Crawford, Wilbert Gamble, J. W. Gillett, D. K. Law, D. J. Lee, D. E. Mattson, L. T. Miller, J. H. Peters, F. M. Stout, J. H. Wales, P. D. Whanger
ASSISTANT PROFESSORS: F. W. Adams, E. M. Benson, W. C. Renfro
INSTRUCTORS: M. A. Edwards, M. J. Woodring

Established in 1965, this Institute recognizes that food needs and resources constitute a continuing problem of civilization. It has as its broad objectives the stimulation, encouragement, facilitation, and coordination of research efforts in the varied fields of nutrition as practiced in the departments and schools of Oregon State University. These objectives are served through the sponsorship of interdepartmental and institutional seminars, symposia, and workshops, through coordination of nutrition course offerings, and through facilitating entry of qualified scientists and graduate students into nutrition research through their particular disciplines. With the counsel of an Advisory Board, the Institute is administered by a Director under the Vice President for Research and Graduate Studies with the cooperation of the Dean of Administration. The deans of Agriculture, Home Economics, Science, and the Graduate School serve as consultants to the Institute.

Water Resources Research Institute

RORERT M. ALEXANDER, Director
WILLIAM H. BUCKLEY, Executive Secretary

The Water Resources Research Institute was established in 1960 to foster, encourage, and facilitate research and education related to all factors that affect the quantity and quality of water available for beneficial use. The Institute is administered through the Schools of Agriculture, Engineering, and Forestry and its members include all personnel in higher learning in Oregon who are engaged in water resources research and training. The membership currently numbers about 200 persons in 20 different departments.

Extensive facilities are available to Institute members and students for research and training. These include forested watershed lands and associated field equipment, soils laboratories, water and waste treatment plants, experimental waste treatment facilities, freshwater and marine science laboratories including oceanographic research vessels, experimental streams, an electronic computing center, a hydraulics laboratory, and a radiation center. Research assistantships and fellowships are available through many of the member departments, and the Institute provides support for selected portions of the research and training program in water resources.

The Institute works closely with federal and state agencies. Seminars are sponsored each quarter and the papers published; a periodic newsletter is disseminated both on and off campus; special reports are given wide distribution. Research projects are underway in the areas of water supply and quality, planning and management, systems analysis, and legal complexities.

Environmental Remote Sensing Applications Laboratory

BARRY J. SCHRUMPF, Acting Director

This laboratory was founded in 1970 as an outgrowth of the increasing involvement of the staff of the Rangeland Resources Program in developing techniques of ecological resource inventory and analysis through remote sensing. Under NASA-USDA support, this group has been involved since its founding with the evaluation and development of Earth Resources photography taken from both space and high flying aircraft platforms.

The primary purpose of the Laboratory is to engage in research and extension activities that will help the State solve environment-, resource-, and human-related problems through inventory, analysis, and monitoring by appropriate remote sensing systems. To achieve this purpose, the Laboratory, its staff, and collaborating departments interact closely with various State and Federal agencies, councils of government, counties, and urban groups.

Forest Research Laboratory

CARL HENRY STOLTENBERG, Ph.D., Dean, Director.

DALE NESTRUD BEVER, M. F., Assistant Director.

RUDOLPH MARTIN KALLANDER, M. F., Assistant Director.

WILBUR T. VARAH, Fiscal Officer.

FOREST ENGINEERING: Professors Davies, Jemison, O'Leary; Associate Professors Aulerich, Brown (department head), Froehlich, Gay; Assistant Professors Berglund, Harr, K. Johnson; Instructors Dykstra, Rowley

FOREST MANAGEMENT: Professors Dilworth (department head), Bell, Berg, Ching, Ferrell, Hermann, Lavender, Overton, Wheeler; Associate Professors Beuter, Black, Hooven, Irgens-Moller, Newton, Paine, Sutherland, Waring, Zaerr; Assistant Professors Downing, Streeby; Research Associates Cromack, Glenn, Grier, Webb

FOREST PRODUCTS: Professors Resch (department head), Atherton, McKimmy; Associate Professors Bublitz, Corder, Currier, Graham, J. Johnson, Krahmer, Laver, McMahan, Wellons; Assistant Professors Kozlik, Miller, Polensek, Schuldt, J. Wilson; Research Associate Scheffer

Forestry research at Oregon State University began in the 1920's. In 1941 an appropriation from the State General Fund was made available for forest products research. State forestry research activities were expanded in 1947 when a forest products harvest tax was established to finance additional research. The program was given further impetus in 1957 with construction of the Oregon Forest Research Center in Corvallis, providing new facilities for the state forestry research program administered by the Forest Protection and Conservation Committee.

In 1961, the staff and functions of the Oregon Forest Research Center were transferred to Oregon State University when the Legislative Assembly enacted a law directing the State Board of Higher Education to establish a Forest Research Laboratory at Oregon State University. As a result, the forestry research program benefits from the advice and counsel of a Forestry Research Advisory Committee comprised of representatives from forest industry and public forestry agencies.

The program of the Forest Research Laboratory is conducted by the faculty of the School of Forestry and cooperating faculty in other departments of the University. It constitutes one of the largest university forestry research programs in the nation. The program is designed to provide information which will enable wiser public and private decisions concerning the management and use of Oregon's forest resources and the operation of her wood-using industries. As a result of this research, Oregon's forests produce increased yields of wood products, water, forage, fish, wildlife, and recreation; wood products are harvested and used more efficiently; forests are used more intensively and effectively; employment, production, and profitability in dependent industries is strengthened; and assistance is provided in maintaining a quality environment for Oregon's people.

Activities are organized into three areas: Forest Engineering, Forest Management, and Forest Products. Forest Engineering research includes planning and design of timber harvesting and transportation systems that have least impact on the environment, forest hydrology, watershed management, and climatology. Forest Management studies are concerned with physiological and ecological behavior of forest trees and plants, reforestation techniques, tree improvement, and control of forest damage by animals; with improved cultural practices, growth and yields of young-growth forests; remote sensing of the forest environment; and with the effect of various public and private forestry programs on the forest economy and all Oregon residents. Forest products research is concerned with basic wood properties, the relationship of tree growth to wood quality, timber mechanics and wood engineering, wood and bark chemistry, pulp and paper, manufactured products, forest products processing and marketing, improved utilization, wood seasoning, wood treatment and preservation, and with the alleviation of air and water pollution. The Forest Research Laboratory helps support research activities of graduate students in forest genetics, forest economics, forest tree physiology, forest biometrics, forest hydrology, forest engineering, forest ecology, forest entomology, forest pathology, forest soils, and wood science with emphases in wood chemistry, wood physics, wood anatomy, and timber mechanics.

The Laboratory supplies results of research and provides technical information to forest land owners and managers, to manufacturers and users of forest products, to leaders of government and industry, and to others who are interested. The Laboratory also undertakes cooperative research financed by individuals, corporations, associations, and government agencies. Field experiments in forest genetics, young-growth management, forest hydrology, and reforestation are maintained on lands of the School of Forestry and of public and private cooperating agencies.

OREGON STATE UNIVERSITY FACULTY

As of January 1974

This list includes the Oregon State University officers of administration, instruction, research, and extension at Corvallis, in the counties, and at experiment stations in various parts of the state. It includes also U.S. Department of Agriculture scientists and those staff members of the State System of Higher Education who hold academic rank and are stationed in Corvallis. The main listing includes only faculty members with rank of *professor, associate professor, assistant professor, instructor,* or *research associate.* Faculty with academic rank of *research assistant unclassified* are listed separately at the end of the main roster.

The date following the name indicates the year of appointment to the OSU faculty. If there is more than one date, a break in service is indicated. For example, "(1959-66, 1973)" indicates appointment to the faculty from 1959 to 1966, a break in service, and then continuous service since 1973.

MARY EUNICE ABBOTT (1959)
State Extension Agent, Community Resource Development (Associate Professor).
B.A., Oklahoma Baptist University, 1932; M.A., Oklahoma State, 1956.

ARTHUR EUGENE ABRASSART (1966)
Assistant Professor of Business Administration.
B.S.M.E., Illinois Institute of Technology, 1963; M.A. Illinois, 1964 Ph.D., 1967.

JOHN ADAIR (1953)
Senior Instructor in Animal Science.
B.S., Oregon State, 1950.

DAVID GORDON ADAMS (1972)
North Willamette Area Horticultural Extension Agent (Associate Professor).
B.S., Michigan State, 1959, M.S., 1962; Ph.D., Oregon State, 1966.

FRANK WILLIAM ADAMS (1953)
Assistant Professor of Chemistry, Agricultural Chemistry.
B.S., Montana State, 1948; M.S., Oregon State, 1950, Ph.D., 1965.

HOLYOKE P. ADAMS (1971)
Dairy Specialist (Associate Professor).
B.S., Maine, 1944; M.S., Wisconsin, 1948, Ph.D., 1952.

THOMAS FRANCIS ADAMS (1946)
Director of Housing (Professor Emeritus).
B.S., Oregon State, 1930.

LEONARD ALLEN ADOLF (1955)
Professor of History.
B.A. Ed., Central Washington College, 1943; B.A., Washington, 1946, Ph.D., 1953.

WALTER MILO ADRION (1939)
Professor Emeritus of Physical Education.
B.S., Eastern Michigan University, 1924; M.A., Michigan, 1939.

WILLIAM RICHARDS ADRION (1972)
Assistant Professor of Electrical and Computer Engineering.
B.S., Cornell, 1966, M.E.E., 1967; Ph.D., Texas at Austin, 1971.

KENNETH MARTIN AHRENDT (1971)
Associate Professor of Education.
B.A., Arizona State, 1959, M.A., 1962; Ed.D., British Columbia, 1969.

ARTHUR LEMUEL ALBERT (1923)
Professor Emeritus of Electrical and Computer Engineering.
B.S., Oregon State, 1923, M.S., 1926, E.E., 1939.

BETTY J. ALBIN (1963)
Associate Professor of Physical Education.
B.S., Illinois, 1947; M.S., 1950.

CAPI LEE ALEXANDER (1972)
Marion County Extension Agent (Instructor).
B.S., Oregon State, 1968, M.S., 1969.

GERALD CORWIN ALEXANDER (1955)
Associate Professor of Electrical and Computer Engineering.
B.S., Oregon State, 1951; Sc.M., MIT, 1959; Ph.D., California at Berkeley, 1973.

ROBERT M. ALEXANDER (1946)
Professor, Director, Air Resources Center and Water Resources Research Institute.
B.S., Oregon State, 1942; M.A., Harvard, 1949.

MOHAMMED TASKEEN AliNIAZEE (1972)
Assistant Professor of Entomology.
B.Sc., A.P. Agricultural University (Hyderabad, India), 1966; Ph.D., California at Riverside, 1970.

IRA SHIMMIN ALLISON (1928)
Professor Emeritus of Geology.
A.B., Hanover College, 1917; Ph.D., Minnesota, 1924.

JAMES CHARLES ALLEN (1973)
Instructor in Naval Science, SSgt Marine Corps.

JOHN SHARER ALLEN JR. (1973)
Associate Professor of Oceanography.
B.S.E., Princeton, 1959, Ph.D., 1968.

LEONARD JOHN ALLEN (1915)
State 4-H Club Leader (Professor Emeritus).
B.S., Oregon State, 1914, M.S., 1915.

ROBERT GREGORY ALLEN (1972)
Assistant Alumni Director (Instructor).
B.S., Oregon State, 1970.

THOMAS CORT ALLEN, JR. (1962)
Professor of Plant Pathology.
B.S., Wisconsin, 1953; Ph.D., California (Davis), 1956.

LONNIE DEE ALLISON (1974)
Assistant Professor of Agronomy, Klamath Experiment Station.
B.S., Sam Houston Univ., 1963; M.Ed., 1964; Ph.D., Missouri, 1971.

DELMAR ISAAC ALLMAN (1937)
Professor Emeritus of Physical Education.
B.S., Michigan State Normal College, 1928; M.S., Michigan, 1931, Dr.P.H., 1936.

RAYMOND RICHARD ALLMARAS (1972)
Professor of Soil Science (Courtesy).
B.S., North Dakota State, 1952; M.S., Nebraska, 1956; Ph.D., Iowa State, 1960.

MARGARET MARIE ALLYN (1954)
County Extension Agent, Home Economics (Assistant Professor Emeritus) Columbia County.
B.A., Iowa, 1926.

RONALD HERBERT ALVARADO (1962)
Professor of Zoology.
B.A., California (Riverside), 1956; M.S., Washington State, 1959, Ph.D., 1962.

MATT MATSUKICHI AMANO (1967)
Associate Professor of Business Administration.
B.A., Meiji Gakuin University, 1959; M.B.A., UCLA, 1962, Ph.D., 1966.

JAMES JOSEPH AMATO (1972)
Visiting Assistant Professor of Physics.
B.S., Manhattan College, 1962; M.S., Yale, 1963, Ph.D., 1968.

DONALD LOUIS AMORT (1959)
Associate Professor of Electrical and Computer Engineering.
B.S. (E. Eng.), Oregon State, 1954, M.S. (E. Eng.), 1960.

WILBERT LOWELL ANDERSEN (1950-51, 1956)
County Extension Agent (Assistant Professor), assigned to AID (Turkey) contract 1974-75.
B.S., Oregon State, 1950, M.Agr., 1970.

ARTHUR WALLACE ANDERSON (1953)
Professor of Microbiology.
B.S., North Dakota State, 1942; M.S., Wisconsin, 1947; Ph.D., Oregon State, 1952.

CARL LEONARD ANDERSON (1949)
Professor Emeritus of Health.
B.S., Michigan, 1928, M.S., 1932, Dr.P.H., 1934.

CLIFFORD ANDERSON (1970)
Associate Professor and Physician, Student Health Service.
B.S., Washington, 1939; M.D., Oregon, 1944; M.P.H., Harvard, 1960.

DAVID JON ANDERSON (1972)
Harney County Extension Agent (Instructor).
B.S., Oregon State, 1971.

DONALD EUGENE ANDERSON (1944-45, 1950)
Extension Dairy Specialist (Associate Professor).
B.S., Iowa State, 1939.

EDWIN LeROY ANDERSON (1970)
Assistant Professor of Education.
B.S., Kansas, 1952; M.Ed., Washington, 1959; Ph.D., Oregon State, 1970.

ERLAND GREGORY ANDERSON (1973)
Instructor in English.
B.A., UCLA, 1968; M.A., Washington, 1970, Ph.D., 1973.

GORDON WILCOX ANDERSON (1962)
Professor of Health.
B.S. in Ed., Central Washington College of Education, 1943; M.A., Colorado State College of Education, 1949; Ed.D., New York University, 1961.

JAMES EDWARD ANDERSON (1964)
Assistant Basketball Coach (Assistant Professor).
B.S., Oregon State, 1959, M.Ed., 1962.

NELSON CHRISTIAN ANDERSON (1946)
Polk County Extension Agent (Professor).
B.S., North Dakota Agricultural College, 1942.

NORMAN HERBERT ANDERSON (1962)
Associate Professor of Entomology.
B.S.A. (Honors), British Columbia, 1955; M.S. Oregon State, 1958; D.I.C., Imperial College, 1961; Ph.D., London, 1961.

ROBERTA FRASIER ANDERSON (1959)
Extension Family Life Specialist (Professor).
B.A., Washington State, 1933; M.S.W., Washington, 1952.

SONIA R. ANDERSON (1968)
Associate Professor of Biochemistry and Biophysics.
B.S., Nebraska, 1961; Ph.D., Illinois, 1964.

R. DUANE ANDREWS (1965)
Director, Division of Continuing Education, Professor of Education.
B.Ed., Colorado State University, 1951; M.A., Wyoming, 1956, Ph.D., 1960.

M. VIRGINIA ANDRICK (1970)
Visiting Assistant Professor of Architecture.
B.A., Michigan State, 1956.

ALDO ANDREOTTI (1973)
Professor of Mathematics.
Ph.D., University of Pisa, 1947.

DEE GUS ANDROS (1965)
Head Coach of Football (Professor), Intercollegiate Athletics.
B.S., Oklahoma, 1950, M.S., 1952.

ALLEN FRANCIS ANGLEMIER (1956)
Professor of Food Science and Technology.
B.S., Fresno State, 1953; M.S., Oregon State, 1955, Ph.D., 1957.

PHILIP MARSHALL ANSELONE (1963)
Professor of Mathematics.
B.A., Puget Sound, 1949, M.S., 1950; Ph.D., Oregon State, 1957.

PETER ANTON (1956)
Professor of Philosophy.
A.B., Indiana, 1952, M.A., 1954, Ph.D., 1960.

THOMAS ALLEN APPEL (1973)
Instructor in Business Administration.
B.S., Oregon State, 1959; M.A., Humboldt State, 1969.

SPENCER BUTLER APPLE, JR. (1950)
Professor of Horticulture.
B.S., Texas A & M, 1933, M.S., 1936; Ph.D., Washington State, 1953.

ARNOLD PIERCE APPLEBY (1959)
Professor of Crop Science.
B.S., Kansas State, 1957, M.S., 1958; Ph.D., Oregon State, 1962.

JAMES HERBERT ARMITAGE (1970)
Associate Professor of Education.
B.S., Western Michigan, 1949; M.Ed. University of Colorado, 1954, Ed.D., 1967.

BRADFORD HENRY ARNOLD (1947)
Professor of Mathematics.
B.S., Washington, 1938, M.S., 1940; Ph.D., Princeton, 1942.

GEORGE HENRY ARSCOTT (1953)
Professor of Poultry Nutrition, Head of Department.
B.S., Oregon State, 1949; M.S., Maryland, 1950, Ph.D., 1953.

CAROL ANN ASHLEY (1971)
Columbia County Extension Agent (Instructor).
B.S., Minnesota, 1962; M.S., Oregon State, 1970.

RICHARD ASTRO (1966)
Associate Professor of English; Assistant to the Vice President for Research and Graduate Studies.
B.A., Oregon State, 1964; M.A., Colorado, 1965; Ph.D., Washington, 1969.

GEORGE H. ATHERTON (1961)
Professor of Forest Products (Mechanical Engineer).
B.S., Oregon State, 1950, M.S., 1966.

HAROLD G. ATHON (1971)
Assistant Football Coach (Assistant Professor).
A.B., San Francisco State, 1958; M.A., Sacramento State, 1968.

CLEMENTE ATKINSON (1972)
Assistant Director of Upward Bound, Special Services (Instructor).

PAT H. ATTEBERRY (1966)
Professor of Industrial Education and Head of Department.
M.S., Kansas State at Pittsburg, 1952; Dr.Ed., Missouri, 1954.

VERNON DALE ATWOOD (1967)
Washington County Extension Agent, 4-H and Youth, (Instructor).
B.S. in Agr., Washington State, 1960.

WINFRED McKENZIE ATWOOD (1913)
Professor Emeritus of Botany.
A.B., Cornell College, 1907, A.M., 1910; M.S., Chicago, 1911, Ph.D., 1913.

DEAN EDWARD AULERICH (1972)
Associate Professor of Forest Engineering.
B.S.F.E., Oregon State, 1960; M.B.A., Arizona State, 1965; Ph.D., Idaho, 1971.

JAMES WALTER AYRES (1970)
Assistant Professor of Pharmaceutical Science.
B.S., Idaho State, 1965; Ph.D., Kansas, 1970.

JERRY KEITH BABBITT (1969)
Research Associate in Food Science and Technology, Seafoods Laboratory (Astoria).
B.S., Washington State, 1965, M.S., 1967, Ph.D., 1969.

LIAHNA K. BABENER (1973)
Assistant Professor of English.
A.B., Whitman, 1968; M.A., UCLA, 1970, C. Phil., 1971.

GILBERT ARTHUR BACHELOR (1961)
Instructor in Computer Science and Computer Center.
B.A., Eastern Washington College, 1953; M.S., Oregon State, 1955.

JAMES RONALD BAGGETT (1956)
Professor of Horticulture.
B.S., Idaho, 1952; Ph.D., Oregon State, 1956.

JACK CLAYTON BAILES (1972)
Assistant Professor of Business Administration.
A.B., Stanford, 1968; M.B.A., Columbia, 1970; Ph.D., Washington, 1973.

LEEDS CRIM BAILEY (1941)
Malheur County Extension Agent, (Associate Professor).
B.S., Oregon State, 1941; M.A., Michigan State, 1962.

SAMUEL HALL BAILEY (1947)
Director of Information (Professor).
B.S., Utah State, 1942; M.S., Wisconsin, 1947.

GEORGE WILLIAM BAIN (1946-52; 1953)
Malheur County Extension Agent (Associate Professor).
B.S., Oregon State, 1943.

DEREK JOHN BAISTED (1964)
Associate Professor of Biochemistry and Biophysics.
B.Sc., Exeter University (England), 1957, Ph.D., 1960.

KATHERINE HASKELL READ BAKER (1941)
Professor Emeritus of Family Life.
A.B., Mills College, 1925; M.S., Purdue, 1938.

ROBERT STEVEN BAKER (1969)
Systems Analyst Library; Diving Coach (Instructor).
B.S., (Mathematics), B.S., (General Science), Oregon State, 1964, M.S., 1973.

FLORENCE STAHL BAKKUM (1942-51, 1954)
Assistant Professor Emeritus of Mathematics.
B.A., Grinnell, 1916; M.A., Cornell, 1923.

CHARLES S. BALLANTINE (1960)
Professor of Mathematics.
B.S., Washington, 1953; Ph.D., Stanford, 1959.

DONALD LEWIS BARBER (1967)
Visiting Assistant Professor of Business Administration.
B.S., Oregon State, 1953.

ROBERT CHARLES BARD (1969)
Assistant Professor of Geography.
B.S., Wisconsin, 1951, M.S., 1957; Ph.D., UCLA, 1972.

DEBORAH LYNNE BARKER (1972)
Extension Home Economist—4-H Youth and Development (Instructor).
B.S., Oregon State, 1972.

GEORGE HECTOR BARNES (1943)
Professor Emeritus of Forest Management.
B.S., Washington, 1924; M.S., California, 1929; Ph.D., Duke, 1946.

LLOYD CARL BARON (1945-46, 1957)
Washington County Extension Chairman (Professor).
B.S., Oregon State, 1940; M.Ag.Ed., Arizona, 1965.

ROBERT BENJAMIN DENIS BARON (1954)
Professor Emeritus of Education.
B.A., Alberta, 1940, B.Ed., 1942, M.Ed., 1945; Ph.D., USC, 1948.

JOHN ALLEN BAROSS (1971)
Research Associate in Microbiology.
B.A., San Francisco State, 1963, M.S., 1966; Ph.D., Washington, 1971.

JAMES GARNET BARRATT, JR. (1950)
Athletic Director, Intercollegiate Athletics (Professor).
B.S., Oregon State, 1950.

GEORGENE VIOLETTE BARTE (1959)
Associate Professor of Foods and Nutrition.
B.S., New Mexico, 1946; M.S., Iowa State, 1948.

CLAUDIA FRANCOISE BARTON (1974)
Assistant Professor of Electrical and Computer Engineering.
B.S., Algiers, 1961; M.S., Grenoble, 1962, Doctorate, 1965.

JOHN P. BARTON (1971)
Associate Professor of Nuclear Engineering.
B.Sc., Birmingham, 1956, M.Sc., 1957, Ph.D., 1966.

ALFRED FRANK BARTSCH (1966)
Director, National Environmental Research Center, Environmental Protection Agency (Courtesy Professor).
B.A., Minnesota, 1936; Ph.D., Wisconsin, 1939.

CHARLES EARL BASSETT JR. (1973)
Instructor in Mechanical and Metallurgical Engineering.
B.S., Oregon State, 1966.

EARL M. BATES (1969)
National Weather Service Advisory Agricultural Meteorologist (Courtesy Assistant Professor).
B.S., Portland State, 1965.

JOHN EDWARD BATES (1972)
Visiting Assistant Professor of Business Administration.
B.S., Oregon State, 1956; M.B.A., Oregon, 1967.

TIMOTHY G. BAUGH (1973)
Instructor in Anthropology.
B.A., Oklahoma, 1967, M.A., 1970.

JO ANN BAUGHMAN (1967)
Research Associate, Computer Center.
B.A. (Science), B.A. (Education), Eastern Oregon College, 1961.

DONALD JOHN BAUMGARTNER (1967)
Associate Professor of Civil Engineering (Courtesy), National Environmental Research Center, Environmental Protection Agency.
B.S., Illinois, 1955; M.S., MIT, 1958; Ph.D., Oregon State, 1967.

CHRISTOPHER JEFFREY BAYNE (1971)
Assistant Professor of Zoology.
B.S., University of Wales, 1963, Ph.D., 1967.

GARY ALLEN BEALL (1971)
Assistant Editor (Assistant Professor), Agricultural Experiment Station.
B.S., California Polytechnic, 1965; M.S., Oregon, 1972.

KENNETH L. BEALS (1970)
Assistant Professor of Anthropology.
B.A., Oklahoma, 1965, M.A., 1967; Ph.D., University of Colorado, 1971.

LESTER MILLER BEALS (1962)
Professor of Education; Coordinator, Liberal Arts Education.
A.B., Nebraska, 1932, M.A., 1934; Ed.D., Oregon, 1950.

GEORGE STANLEY BEAUDREAU (1963)
Professor of Chemistry, Agricultural Chemistry.
B.S., Washington State, 1949; M.S., Oregon State, 1951, Ph.D., 1954.

DARRELL V. BEAVERS (1964)
Associate Professor of Food Science and Technology.
B.S., California, 1940.

WILLIAM MARK BECK (1965)
Science and Engineering Specialist, Division of Continuing Education (Associate Professor).
B.S., Southern Oregon, 1959; M.S., Oregon State, 1962.

BORIS WILLIAM BECKER (1970)
Assistant Professor of Business Administration.
B.S., California, 1962, M.B.A., 1967, Ph.D., 1970.

DAVID ALFRED BECKER (1973)
Instructor in Aerospace Studies, Staff Sgt, USAF.

GERALD LESTER BECKER (1968)
Associate Professor of Education.
B.S., Idaho, 1950, M.S., 1951; Ed.D., Oregon, 1967.

MANNING HENRY BECKER (1948)
Extension Farm Management Specialist; Professor of Agricultural Economics.
B.S., Oregon State, 1947, M.S., 1948.

ROBERT RICHARD BECKER (1962)
Professor of Biochemistry.
B.S., North Dakota, 1948; M.S., Wisconsin, 1951, Ph.D., 1952.

LEWIS STEVEN BECKHAM (1972)
Extension Specialist, Assistant Professor of Agronomic Crop Science.
B.S., Tennessee, 1968; M.S., Cornell, 1970, Ph.D., 1973.

RUTH NEPTUNE BECKWITH (1972)
Assistant Professor of Home Management.
B.A., Montana, 1954; M.S., Cornell, 1965.

THOMAS ERWIN BEDELL (1966-70, 1973)
Area Extension Agent (Associate Professor).
B.S., California State Polytechnic, 1953; M.S., California at Berkeley, 1957; Ph.D., Oregon State, 1966.

FRANK M. BEER (1947)
Professor Emeritus of Biology, (General Science).
B.S., Oregon, 1929; M.S., Washington, 1939.

WARREN RAY BEESON (1973)
Klamath County Extension Agent, 4-H and Youth Development.
A.A., Imperial Valley College, 1962; B.A., Oregon State, 1971.

PAUL ALLEN BEEZHOLD (1969)
Instructor in English.
B.A., Washington, 1964; M.A., Oregon, 1969.

LYNN LORENE BELCHER (1970)
Instructor in Pharmaceutical Sciences; Pharmacist, Student Health Center.
B.S., Oregon State, 1970.

J. RICHARD BELL (1962)
Professor of Civil Engineering.
B.S.C.E., Purdue, 1952; M.S.C.E., 1956, Ph.D., 1963.

JOHN FREDERICK BELL (1959)
Professor of Forest Management.
B.S.F., Oregon State, 1949; M.F., Duke, 1951; Ph.D., Michigan, 1970.

DAVID ANDREW BELLA (1967)
Associate Professor of Civil Engineering.
B.S., Virginia Military Institute, 1961; M.S., New York University, 1964; Ph.D., 1967.

CLEON VERNON BENNETT (1958)
Associate Professor of Speech Communication.
B.S., Murray State College (Kentucky), 1955; M.A., Southern Illinois, 1958; Ph.D., Wisconsin, 1971.

NOEL LINDSAY BENNION (1937)
Extension Poultry Specialist (Professor Emeritus).
B.S., Utah State, 1928; M.S., Kansas State, 1932.

EVA MAE BENSON (1958)
Assistant Professor of Nutrition.
B.A., UCLA, 1949; M.A., Los Angeles State, 1955.

ALAN BEN BERG (1961)
Professor of Forest Management.
B.S., Oregon State, 1941; M.F., Washington, 1955.

ERWIN ROYD W. BERGLUND (1973)
Assistant Professor of Forest Engineering, Watershed Extension Specialist.
B.S., Minnesota, 1965;M.S., Arizona, 1967; Ph.D., Minnesota, 1970.

ROBERT WILLIAM BERGSTROM (1941-42, 1946-47, 1950)
Professor of Physical Education, Assistant Director of Division of Health and Physical Education.
B.S., Oregon State, 1937; M.A., Columbia, 1942, Ed.D., 1947.

DONALD L. BERINGSON (1971)
Assistant Professor of Business Education.
B.S., North Dakota, 1962, M.S., 1966, Ph.D., 1971.

NORBORNE BERKELEY (1946)
Professor Emeritus of History.
A.B., Oregon, 1924; M.A., Harvard, 1931.

PAUL EMILE BERNIER (1947)
Professor of Poultry Genetics.
B.S.A., Université Laval, 1932; Ph.D., California, 1947.

DONALD WILSON BERRY (1954)
Jackson County Extension Agent (Professor).
B.S., Oregon State, 1947; M.S., University of California, 1962.

JOSEPH HOWARD BERRY (1951)
Assistant to the President (Professor Emeritus)
B.S., Oregon State, 1929, Ed.M., 1954.

RALPH EUGENE BERRY (1968)
Assistant Professor of Entomology.
B.S., Colorado State University, 1963, M.S., 1965; Ph.D., Kansas State, 1968.

RALPH STEPHEN BESSE (1922)
Professor Emeritus of Agriculture.
B.S.A., Missouri, 1913, M.S., 1915. Associate Director of Agricultural Experiment Station, 1949-53.

RALPH STEPHEN BESSE, JR. (1963)
Lane County Extension Chairman (Associate Professor).
B.S., Oregon State, 1943, M.Ag., 1971.

JOHN HERMAN BEUTER (1970)
Associate Professor of Forest Management.
B.S., Michigan State, 1957, M.S., 1958; Ph.D., Iowa State, 1966.

DALE NESTRUD BEVER (1961)
Professor of Forest Management, Assistant Dean, School of Forestry.
B.S., Oregon State, 1942, M.F., 1954.

GOBIND S. BHAGIA (1971)
Research Associate in Agricultural Economics.
B.A., Rajasthan University (India), 1962; M.S., Texas A & M, 1967; Ph.D., Oregon State, 1971.

CHARLOTTE COLEMAN BIBB (1973)
Associate Director, Portland Urban Teacher Education Program, Instructor in Education.
B.S., Oregon State, 1971; M.A., Portland State, 1973.

DAVID T. BICE (1973)
Counselor, Counseling Center (Assistant Professor).
B.S., Bradley, 1966, M.A., 1969; Ph.D., Missouri at Columbia, 1973.

HERMAN ELDON BIERMAN (1952)
Umatilla County Extension Agent (Assistant Professor Emeritus).
B.S., Oregon State, 1948.

WILLIAM HOLLIS BILLINGS (1966)
Plant Materials Specialist, Plant Materials Center (Courtesy Assistant Professor).
B.S., Kansas State, 1951.

DONALD DUANE BILLS (1961-64, 1965)
Associate Professor of Food Science and Technology.
B.S., Oregon State, 1959, M.S., 1964; Ph.D., 1966.

JANET M. BINDER (1974)
Extension Agent—4-H and Youth (Instructor).
B.S., Michigan State, 1973.

JULIUS FLOYD BINDER (1952)
Jefferson County Extension Agent, Livestock Area (Associate Professor).
B.S., Kansas State, 1948; M.S., Colorado State University, 1967.

STEPHEN ELLIS BINNEY (1973)
Assistant Professor of Nuclear Engineering.
B.S., Oregon State, 1964; M.S., California at Berkeley, 1966, Ph.D., 1970.

ROBERT HILL BIRDSALL (1952)
Professor of Journalism.
B.A., Idaho State, 1949; M.A., Stanford, 1952.

DAVID SPENCER BIRKES (1973)
Research Associate in Statistics.
B.S., Stanford, 1964; M.S., Chicago, 1966; Ph.D., Washington, 1969; M.S., Oregon State, 1972.

NORMAN IVAN BISHOP (1963)
Professor of Plant Physiology.
B.S., Utah, 1951, M.S., 1952, Ph.D., 1955.

PAUL EDWARD BISHOP (1973)
Research Associate in Botany and Plant Pathology.
B.S., Washington State, 1964; M.S., Oregon State, 1970, Ph.D., 1973.

HAROLD MAYFIELD BLACK (1949)
Area 4-H Extension Agent, Portland Metropolitan Area (Professor).
B.S., Oregon State, 1947; M.S., Michigan State, 1962.

HUGH CLARK BLACK (1962)
Associate Professor of Forest Wildlife Ecology.
B.S., Pennsylvania State, 1950; M.S., Oregon State, 1955; Ph.D., 1965.

EVA BLACKWELL (1924)
Assistant Registrar (Assistant Professor Emeritus).
B.S., Oregon State, 1924.

RICHARD JAY BLAKELY (1972)
Assistant Professor of Oceanography.
B.S., Oregon State, 1968; M.S., Stanford, 1971, Ph.D., 1972.

GRANT E. BLANCH (1945)
Professor of Agricultural Economics, Research Coordinator.
B.S., Utah State, 1940; M.S., Illinois, 1941; Ph.D., Cornell, 1944.

DALE BLEVINS (1972)
Research Associate in Botany.
B.S., Southwest Missouri State, 1965; M.S., Missouri, 1967; Ph.D., Kentucky, 1972.

JOHN HARVEY BLOCK (1966)
Associate Professor of Pharmaceutical Chemistry.
B.S., B.Phr., Washington State, 1961, M.S., 1963; Ph.D., Wisconsin, 1966.

STEFAN DAVID BLOOMFIELD (1971)
Assistant Director of Institutional Research, Assistant Professor of Business Administration.
B.E.S., Johns Hopkins, 1966; M.S., Stanford, 1968, Ph.D., 1972.

WILBUR LEROY BLUHM (1957)
Marion County Extension Chairman (Associate Professor).
B.S., Nebraska, 1947; M.S., Purdue, 1964.

CHARLES HENRY BLUMENFELD (1962)
Assistant to the President (Associate Professor Emeritus).
A.B., Illinois, 1928, J.D., 1930.

GUNNAR BODVARSSON (1964)
Professor of Mathematics, Professor of Geophysical Oceanography.
B.S., Technical University of Berlin, 1943; Ph.D., California Institute of Technology, 1957.

FLOYD WALTER BODYFELT (1964)
Associate Professor of Food Science and Technology; Extension Dairy Processing Specialist.
B.S., Oregon State, 1963; M.S., 1967.

OLAF ALEXANDER BOEDTKER (1963)
Associate Professor of Physics; Director, Engineering Physics; Head Advisor, College of Science.
B.S., Swiss Federal Institute of Technology, 1949; M.S., California Institute of Technology, 1958, Ph.D., 1961.

LARRY BOERSMA (1960)
Professor of Soil Science.
M.S., The Netherlands, 1955; Ph.D., Cornell, 1959.

RALPH BOGART (1947)
Professor of Animal Genetics; Director, Genetics Institute.
B.S., Missouri, 1934; M.S., Kansas State, 1936; Ph.D., Cornell. 1940.

SAM BOGHOSIAN (1965)
Assistant Football Coach, Intercollegiate Athletics (Associate Professor).
B.S., UCLA, 1956.

CHARLES ALLAN BOICE (1966)
Assistant Professor; Department of Information; Editor, *Oregon Stater*.
B.S., Oregon, 1942, M.S., 1950.

WILLIAM GREGORY BOLDT (1971)
Lane County Extension Agent (Instructor).
B.S., Oregon, 1971.

WALTER BENO BOLLEN (1929)
Professor of Microbiology.
B.S., Oregon State, 1921, M.S., 1922; Ph.D., Iowa State, 1924.

FLOYD EUGENE BOLTON (1967)
Assistant Professor of Agronomy.
B.S., Oklahoma State, 1959; M.S., 1961; Ph.D., Colorado State, 1968.

CARL ELDON BOND (1949)
Assistant Dean of Graduate School; Professor of Fisheries.
B.S., Oregon State, 1947; M.S., 1948; Ph.D., Michigan, 1963.

TURNER HANKS BOND (1943-48, 1950)
Extension Community Development Specialist (Professor).
B.S., Oregon State, 1938; M.S., Michigan State, 1961.

JESSE FRANKLIN BONE (1950)
Professor of Veterinary Medicine.
B.A., Washington State, 1937, B.S., 1949, D.V.M., 1950; M.S., Oregon State, 1953.

EARL EDWARD BONHAM (1955)
Wasco County Extension Agent, 4-H and Youth (Assistant Professor).
B.S., Oregon State, 1950.

DEAN EMERSON BOOSTER (1956)
Professor of Agricultural Engineering.
B.S., Oregon State, 1954, M.S., 1956.

THARALD BORGIR (1967)
Assistant Professor of Music.
M.M., Yale, 1960; Ph.D., California (Berkeley), 1971.

SANDRA MARIA BOSCHETTO (1973)
Visiting Instructor in Spanish, Modern Languages.
B.A., Oregon State, 1972; M.A., Middlebury, 1973.

JOHN ALFRED BOSKIRK (1974)
Instructor in Mechanical and Metallurgical Engineering.
B.S., Oregon State, 1972.

DAVID ARTHUR BOSTWICK (1953)
Associate Professor of Geology.
B.A., Montana, 1942; M.A., Wisconsin, 1951, Ph D., 1958.

LIDO DAN BOTTI (1965)
Assistant Professor of Italian, Modern Languages.
B.A., University of Portland, 1951, M.A., 1953.

RICHARD WILLIAM BOUBEL (1954)
Professor of Mechanical Engineering.
B.S., Oregon State, 1953, M.S., 1954; Ph.D., University of North Carolina, 1963.

ARTHUR JAMES BOUCOT (1969)
Professor of Geology.
A.B., Harvard College, 1948; A.M., Harvard, 1949, Ph.D., 1953.

EDOUARD JOANY BOURBOUSSON (1943)
Professor Emeritus of French.
Licence és Lettres, 1915, Licence en Droit, 1916, Licence és Sciences, 1916, Lyon; Docteur en Droit, 1919, Paris; Docteur de l' Université de Lyon (Lettres, 1950).

WALDO BOWERS (1963)
Assistant Director of Admissions (Associate Professor).
B.A., American Intl. College, 1956; Ed.M., Oregon State, 1959.

BARBRA LOUISE BOWMAN (1972)
Counselor, Educational Opportunities Program (Instructor).
B.S., Oregon State, 1971; M.Ed., 1972.

KENNETH MILTON BOWMAN (1974)
Assistant Professor of Military Science, Capt.
B.A., Eastern Washington State, 1965, B.A., 1965; M.B.A., Oregon State, 1973.

MARIAN Y. BOWMAN (1964)
Associate Professor of Art.
B.F.A., Texas, 1946, M.F.A., 1964.

JAMES ROBERT BOYDSTON (1964)
Associate Professor of Civil Engineering (Courtesy), National Environmental Research Center, Environmental Protection Agency.
B.S., Oregon State, 1949; M.S., Harvard, 1953.

JAMES JOSEPH BRADY (1937)
Professor Emeritus of Physics.
B.A., Reed, 1927; M.A., Indiana, 1928; Ph.D., California, 1931.

HARRISON BRANCH (1972)
Assistant Professor of Art.
B.F.A., San Francisco Art Institute, 1970; M.F.A., Yale, 1972.

NORMAN ROBERT BRANDENBURG (1950)
Associate Professor of Agricultural Engineering (Courtesy); Agricultural Engineer, USDA.
B.S., Colorado, 1944; M.S., Oregon State, 1951.

VERA HASKELL BRANDON (1928)
Professor Emeritus of Home Economics.
B.S., Oregon State, 1911, B.S., 1927, M.S., 1929; Ph.D., Iowa, 1936.

PATRICIA ELIZABETH BRANDT (1959-1961, 1964)
Assistant Head, Social Sciences and Humanities, Library (Associate Professor).
B.S., Mt. Angel College, 1955; B. Mus. Ed., Willamette, 1957, M. Mus. Ed., 1958; M.A., Denver, 1959.

WILLIAM HENRY BRANDT (1956)
Associate Professor of Botany.
B.A., Montana, 1950; M.Sc., Ohio State, 1951, Ph.D., 1954.

THOMAS RENO BRANTNER (1967)
Research Associate, Computer Center.
B.S., Oregon State, 1968.

DAVID BRAUNER (1973)
Instructor in Anthropology.
Assoc., Highline JC, 1967; B.A., Washington State, 1969; M.A., 1972.

EDWARD BROOKS BRAZEE (1964)
Social Science and Humanities Librarian (Assistant Professor).
B.A., Oregon, 1962; M. Librarianship, Washington, 1963; M.A., Oregon, 1973.

LYNNE MARIE BREESE (1963-69, 1970, 1972)
Extension Agent-at-Large (Assistant Professor).
B.S., Oregon State, 1963.

WILBUR PAUL BREESE (1953)
Associate Professor of Fisheries; Marine Science Center, Newport.
B.S., Oregon State, 1951, M.S., 1953.

WILLIAM JAMES BRENNAN (1966)
Assistant Dean of Students (Assistant Professor).
B.S., Oregon State, 1962, M.Ed., 1966.

ROBERT NELSEN BRENNE (1965)
Instructor in Computer Science; Computer Center.
B.A., Reed College, 1953.

M. DIANE BRENNER (1972)
Science-Technical Librarian (Instructor).
B.S., Oregon, 1968; M.L.S., 1972.

DONALD HADEN BREWER (1957)
Extension Certification Specialist (Associate Professor), Agronomic Crop Science.
B.S., Oregon State, 1955; M.S., Missouri, 1967.

ELENA LOUISE BRINEMAN (1973)
Visiting Instructor in Foods and Nutrition.
B.A., Whitman College, 1967.

GWYNETH ELAINE BRITTON (1965)
Assistant Professor of Education.
B.S., Lewis and Clark College, 1957; M.Ed., Oregon, 1963; Ed.D., Oregon State, 1968.

GEORGIA LOUISE BROCK (1973)
Visiting Assistant Professor of Physical Education (Dance).
B.S., UCLA, 1962, M.A., 1966.

GERALD WALTER BROG (1956)
Umatilla County Extension Agent (Associate Professor).
B.S., Oregon State, 1954; M.S., Michigan State, 1964.

RAY FRANKLIN BROKKEN (1965-69, 1971)
Associate Professor of Agricultural Economics (Courtesy); Economic Research Service, USDA.
B.S., Iowa State, 1958, Ph.D., 1965.

FLORENCE RYDER BROMLEY (1955)
Tillamook County Extension Agent (Home Economics) (Assistant Professor Emeritus).
B.S., Oregon State, 1922, M.H.Ec., 1959.

RICHARD L. BROOKS (1965-69, 1973)
Assistant Football Coach, Intercollegiate Athletics (Assistant Professor).
B.S., Oregon State, 1963, Ed.M., 1964.

VICTOR JACK BROOKES (1956)
Professor of Entomology.
B.A., Michigan, 1950; M.S., Illinois, 1951, Ph.D., 1956.

EVELYN ANNE BROOKHYSER (1966)
Lincoln County Extension Agent, Home Economics (Assistant Professor).
B.S., Stout State University, Wisconsin, 1966.

ROYAL HARVARD BROOKS (1967)
Associate Professor of Agricultural Engineering.
B.S., Utah State, 1952; M.C.E., Colorado State University, 1960, Ph.D., 1965.

JOY E. BROUGHER (1962)
Lane County Extension Agent, 4-H and Youth (Associate Professor).
B.S., Oregon State, 1959; M.H.Ec., 1970.

CARL BROWN (1965)
Assistant Professor of Anthropology.
B.A., Mexico City College, 1959; M.A., Oregon, 1967.

CLINTON ALLEN BROWN (1970)
Assistant Professor of Art.
B.F.A.,, Wisconsin, 1965; M.A., Wyoming, 1966; M.F.A., University of Southern California, 1968.

DOROTHY FURTICK BROWN (1955)
Extension Housing-Home Furnishings Specialist, (Associate Professor, Home Management).
B.S., Colorado, 1949; M.S., Oregon State, 1964.

EVELYN STOWELL BROWN (1960)
Lincoln County Extension Agent, Home Economics (Assistant Professor Emeritus).
B.S. in Education, State Teachers College (Framingham, Massachusetts), 1927.

GEORGE WALLACE BROWN (1966)
Associate Professor of Forest Hydrology; Head of Forest Engineering.
B.S., Colorado State University, 1960, M.S., 1962; Ph.D., Oregon State, 1967.

GORDON GEORGE BROWN (1916)
Associate Professor Emeritus of Horticulture, Mid-Columbia Experiment Station.
A.B., Pacific University, 1910; B.S., Oregon State, 1910.

JAMES RUSSELL BROWN (1962)
Associate Professor of Mathematics, Chairman of Department.
B.A., Oregon State, 1953, M.A., 1958; Ph.D., Yale, 1964.

KENNETH NEIL BROWN (1963)
Marion County Extension Agent (Assistant Professor).
B.S., Oregon State, 1961; M.Ag., 1971.

LYLE R. BROWN (1970)
Assistant Professor of Microbiology.
B.A., Willamette University, 1963; Ph.D., Tulane, 1968.

WILLIAM GALEN BROWN (1955)
Professor of Agricultural Economics.
B.S., Kansas State, 1950; M.S., Iowa State, 1953, Ph.D., 1955.

WILLIAM G. BROWNE (1968)
Associate Professor of Business Administration.
B.S.E.E., Case Institute of Technology, 1960; M.B.A., Washington, 1965; Candidate of Philosophy, Michigan, 1967, Ph.D., 1968.

HUGH DANIEL BRUNK (1969)
Professor of Statistics.
B.A., California (Berkeley), 1940; M.A., Rice Institute, 1942, Ph.D., 1944.

JEAN YOUNG BRUNK (1969)
Instructor in English.
B.A., Rice, 1943; M.A., Missouri, 1958.

VELDA JEAN BRUST (1964)
Assistant Professor of Physical Education.
B.S., Oregon State, 1953; Certificate of Occupational Therapy, Southern California, 1955; Registered Occupational Therapist, 1956; Ed.M., Oregon State, 1961.

M. EDWARD BRYAN (1972)
Director of Student Housing and Residence Programs, Student Services (Assistant Professor).
B.A., Southern Illinois, 1956, M.A., 1958.

JOSEPH CHESTER BRYE (1947)
Professor of Music.
B.M., Northwestern, 1940, M.M., 1941.

JANET LAIRD BUBL (1946-48, fall 1959, 1960)
Assistant Professor of Clothing and Textiles.
B.A., Vassar, 1940; M.S., Minnesota, 1941.

WALTER JOHN BUBLITZ (1966)
Associate Professor of Pulp and Paper Chemistry, Forestry.
B.S., Arizona, 1941; M.S., Institute of Paper Chemistry, 1947, Ph.D., 1949.

WILLIAM HARRY BUCKLEY (1962)
Assistant Professor, Executive Secretary, Water Resources Research Institute and Air Resources Center.
B.A., Oregon, 1949; M.A., Hawaii, 1963.

RICHARD JOHN BUCOLO (1974)
Assistant Professor of Electrical and Computer Engineering.
B.S.E.E., California State Polytechnic, 1967; M.S.E.E., USC, 1968.

DAVID ALVIN BUCY (1955)
Associate Professor of Mechanical and Metallurgical Engineering.
B.S., Oregon State, 1955; R.P.E., State of Oregon, 1959; M.S. Washington, 1969.

DONALD RAYMOND BUHLER (1967)
Research Associate in Agricultural Chemistry (Associate Professor).
B.S., Oregon State, 1950, M.S., 1953, Ph.D., 1956.

DELOSS EVERETT BULLIS (1917)
Professor Emeritus of Agricultural Chemistry.
B.S., Oregon State, 1917, M.S., 1929.

THOMAS R. BUNCH (1961-62, 1964)
Crook County Extension Chairman (Associate Professor).
B.S., Oregon State, 1961; M.S., Oregon State, 1965.

ALICE JOYCE BURBOTT (1963)
Research Associate in Biochemistry and Biophysics.
B.S., Lewis & Clark, 1953; M.A., Oregon State, 1963.

DAVID STEWART BURCH (1958)
Professor of Physics.
B.S., Washington, 1950, M.S., 1954, Ph.D., 1956. On sabbatical 1973-74.

FREDRICK JOSEPH BURGESS (1953)
Professor of Civil Engineering; Dean of Engineering.
B.S., Oregon State, 1950; M.S., Harvard, 1955.

BETTY JANE BURKHART (1963)
Washington County Extension Agent (Assistant Professor).
B.S., Oregon State, 1945.

DAVID JAMES BURKHART (1961)
Umatilla County Extension Agent (Associate Professor).
A.B., Northwest Nazarene College, 1951; M.Agr., Oregon State, 1971.

H. RAY BURKHART (1972)
Research Associate in Animal Science.
B.S., Colorado State, 1939; M.S., Texas A&M, 1948; Ph.D., Oregon State, 1972.

WILBUR WILLIS BURKHART, JR. (1947)
Area Extension Agent, North Willamette Valley (Associate Professor).
B.S., Oregon State, 1947.

ROBERT JOHN BURNARD (1969)
Research Associate in Agricultural Chemistry.
B.A., Willamette, 1964; Ph.D., Cornell, 1969.

JAMES ALMON BURR (1951-52, 1960)
Malheur County Extension Agent (Assistant Professor).
B.S., Oregon State, 1951.

RONALD JAMES BURR (1971)
Extension Specialist (Assistant Professor) of Weed Control, Agronomic Crop Science.
B.S., Oregon State, 1967, M.S., 1970; Ph.D., Purdue, 1971.

JUDITH ANN BURRIDGE (1960-62, 1971)
Benton County Extension Agent (Assistant Professor).
B.S., Oregon State, 1960, M.S., 1971.

NEDRY V. BURRIS (1968)
Assistant to Director of Business Affairs (Assistant Professor).
LL.B., Northwestern College of Law (Portland, Oregon), 1951.

ANN LOUISE BURROWS (1971)
Instructor in Family Life.
A.A., Yuba College, 1965; B.S., California (Davis), 1968; M.S., Oregon State, 1972.

GEORGE SHERWIN BURT (1966)
Assistant Professor of Psychology.
A.B., San Jose State, 1957, M.A., 1962; Ph.D., Arizona State, 1972.

JOHN GRINNELL BURT (1973)
Polk County Extension Agent, 4-H and Youth (Instructor).
B.S., California at Davis, 1969; M.S., Arizona, 1972.

WAYNE VINCENT BURT (1954)
Professor of Oceanography; Associate Dean of Research.
B.S., Pacific College, 1939; M.S., Scripps Institution of Oceanography, 1948, Ph.D., 1952; Sc.D., George Fox College, 1963.

MARIE HARRIS BUSSARD (1957)
State Agent, Extension Home Economics
Associate Professor of Foods and Nutrition.
B.S., Montana State, 1956, M.S., 1957.

IRENE BUTTS (1947)
Instructor Emeritus in English.
B.A., Oregon State, 1946.

JOHN VINCENT BYRNE (1960)
Professor and Dean of Oceanography; Acting Director, Marine Science Center.
A.B., Hamilton College, 1951; M.A., Columbia, 1953; Ph.D., USC, 1957.

ODETTE CADART-RICARD (1965)
Associate Professor of French and Modern Language Education; Director, Modern Language Education.
B.A., University of Paris, 1943, LL.B., 1945; B.A., Dominican College, 1947; M.A., Sacramento State College, 1958; Ph.D., Oregon, 1970.

ROBERT FARMER CAIN (1952)
Professor of Food Science and Technology.
B.S., Texas Technological College, 1938; M.S., Texas A and M, 1941; Ph.D., Oregon State, 1952.

DOUGLAS R. CALDWELL (1968)
Associate Professor of Oceanography.
B.A., Chicago, 1955, B.S., 1957, M.S., 1958, Ph.D., 1963.

RICHARD STANLEY CALDWELL (1969)
Assistant Professor of Fisheries, Fisheries and Wildlife.
B.S., California Polytechnic, 1962; Ph.D., Duke, 1967.

WHEELER CALHOUN, JR. (1948)
Associate Professor of Agronomy.
B.S., Oregon State, 1946, M.S., 1953.
On leave 1972-74.

LEONARD J. CALVERT (1961-65, 1969)
Extension Communication Specialist (Associate Professor).
B.A., Oregon, 1955.

LYLE DAVID CALVIN (1953)
Professor and Chairman of Statistics.
B.S., Chicago, 1948; B.S., North Carolina State, 1947, Ph.D., 1953.

H. RONALD CAMERON (1955)
Professor of Plant Pathology.
B.S., California, 1951; Ph.D., Wisconsin, 1955.

DONALD EUGENE CAMPBELL (1969)
Professor of Physical Education.
B.A., Augustana College, 1950; M.S., Oregon, 1956; Ed.D., Colorado State College, 1963.

HOMER JEROME CAMPBELL (1957)
Assistant Professor of Fisheries (Courtesy); Fishery Research Supervisor, Research Division, Oregon Wildlife Commission.
B.S., Oregon State, 1948, M.S., 1963.

JOHN CARL CAMPBELL (1948)
Associate Professor of Industrial and General Engineering.
B.S., Kansas State, 1947; M.S., Oregon State, 1949. Professional Engineer, Oregon, 1961.

KAREN LYNN CAMPBELL (1972)
Student Health Service (Instructor).
B.S., Oregon State, 1965.

ROBERT KENNETH CAMPBELL (1969)
Research Geneticist (Courtesy Associate Professor). Forestry Sciences Laboratory.
B.A., Montana, 1951; M.S., Washington, 1954, Ph.D., 1958.

RONALD KENNETH CAMPBELL (1945)
Professor Emeritus of Organizational Behavior.
A.B., Illinois, 1925; M.B.A., Harvard, 1928; Ph.D., Stanford, 1940. Licensed Psychologist, Oregon.

WILLIAM ALEXANDER CAMPBELL (1966)
Professor and Chairman of Music.
B.M., Eastman School of Music, University of Rochester, 1935; M.A., New York University, 1940.

WILLIAM HOWARD CAMPBELL (1971)
Assistant Professor of Pharmacy Administration.
B.S., Oregon State, 1965, M.S., 1968; Ph.D., Purdue, 1971.

CAROLINE HELENA CANNON (1959-67, 1972)
Extension Agent (Assistant Professor).
B.A., St. Olaf College, 1959; M.A., Pacific Lutheran, 1972.

LYNN ELTON CANNON (1963)
Coos County Extension Chairman (Associate Professor).
B.S., Oregon State, 1958; M.Agr., 1965.

TILMAN MEADE CANTRELL (1956)
Professor of Sociology.
B.A., Texas, 1947, M.A., 1948.

DAVID ALLEN CAPITO (1971)
Assistant Professor of Aerospace Studies; Captain, USAF.
B.S., Kentucky, 1960, M.S., 1961.

JOSEPH CAPIZZI (1955-1963, 1965)
Extension Entomology Specialist (Professor).
B.S., State Teachers College, Indiana, Pennsylvania, 1949; M.S., Oregon State, 1955.

MARY JANET CARDENAS (1971)
Assistant Professor of Biochemistry and Biophysics.
B.A., Oklahoma State, 1963; M.S., Illinois, 1965, Ph.D., 1967.

ANDREW GALBRAITH CAREY, JR. (1961)
Associate Professor of Oceanography.
A.B., Princeton, 1955; Ph.D., Yale, 1962.

HERBERT DEYO CARLIN (1951)
Professor of History.
B.S., Oregon, 1940, M.S., 1947.

MARIAN CUSHING CARLIN (1954)
Associate Professor of Family Life.
B.Sc., Nebraska, 1939; M.Sc., Iowa State, 1943.

ANGELA RUTH CARLSON (1969)
Instructor in Music.
B.A., Idaho, 1964; M.M., Wisconsin, 1965.

DAVID HILDING CARLSON (1963)
Professor of Mathematics.
B.A., San Diego State, 1957; M.S., Wisconsin, 1959, Ph.D., 1963.

ELAINE KATHRYN CARLSON (1958)
Assistant Dean, School of Home Economics; Associate Professor of Clothing, Textiles and Related Arts.
B.A., Northwest Nazarene College, 1942, B.Mus., 1947; M.S., Oregon State, 1960.

MARLAN CARLSON (1969)
Assistant Professor of Music.
B.M.E., Kansas, 1959, B.M., 1959; M.M., Eastman School of Music, 1961, D.M.A., 1964.

MIRIAM ELISE CARLSON (1971)
Hood River County Extension Agent (Instructor).
B.S., North Dakota State, 1968, M.S., 1971.

ROY WERNER CARLSON (1958)
Associate Professor of English.
B.A., University of Omaha, 1952; M.A., Washington, 1957; Ph.D., New Mexico, 1961.

THEODORE HAROLD CARLSON (1951)
Associate Professor of Journalism.
B.S., Oregon State, 1950; M.S., Oregon, 1967.

WILLIAM HUGH CARLSON (1945)
Professor Emeritus, Library.
A.B., Nebraska, 1924; Certificate, New York State Library School, 1926; M.A. (Lib. Sc.) California, 1937.

ANDRE LOUIS CARON (1969)
Regional Engineer, National Council for Air and Stream Improvement. (Courtesy Assistant Professor).
B.S., Maine, 1956, M.S., 1963.

CHARLES E. CARPENTER (1972)
Professor of Education; Coordinator, Community College Education.
B.S., Ft. Hays Kansas State College, 1952; M.A., Colorado, 1959; Ph.D., Texas, 1969.

PAUL CARPENTER (1920-27, 1934)
Professor Emeritus of Agricultural Economics.
B.S., Minnesota, 1932.

JOHN JOSEPH CARPINI (1972)
Director of Accounting, Oregon State System of Higher Education; Assistant Professor of Business & Technology (Courtesy).
M.S., California State at Los Angeles.

GEORGE BARR CARSON, JR. (1961)
Professor of History.
B.A., College of Wooster, 1935; M.A., Chicago, 1940. Ph.D., 1942.

CHERI JO CARTER (1973)
Wasco-Sherman County Extension Agent, Home Economics (Instructor).
B.S., Oregon State, 1971.

DAVID SOUTHARD CARTER (1961)
Professor of Mathematics.
B.A., University of British Columbia, 1946, M.A., 1948; Ph.D., Princeton, 1952.

GEORGE EDWARD CARTER (1960)
Assistant Professor of Agronomy, Klamath Experiment Station (Superintendent).
B.S., Purdue, 1956; M.S., Michigan State, 1960.

RUTH HARRIETT CARTER (1952)
Senior Instructor Emeritus in English.
B.S., Boston University, 1930, M.Ed., 1934.

DAVID WILLIAM CASE (1972)
Assistant Professor of Military Science; Major, U. S. Army.
B.S., Oregon State, 1961.

EMERY NEAL CASTLE (1954)
Dean of Graduate School; Professor of Agricultural Economics.
B.S., Kansas State, 1948, M.S., 1950; Ph.D. Iowa State, 1952.

PHILIP CATALFOMO (1963)
Associate Professor of Pharmacognosy.
B.S., Providence College, 1953; B.S., Connecticut, 1958; M.S., Washington, 1960, Ph.D., 1962.

RUFUS HENRY CATE, JR. (1945)
Douglas County Extension Chairman (Professor).
B.S., Oregon State, 1944; M.Ed., Colorado State University, 1954.

ELEONORE K. CERVANTES (1966)
Assistant Professor of German, Modern Languages.
B.A., Washington, 1964, M.A., 1965.

RAMON ACOSTA CHACON (1970)
Director, Upward Bound (Instructor).
B.S., Texas A & I, 1965; M.Ed., Oregon State, 1973.

HAROLD JOHN CHADWICK (1973)
Instructor in Business and Technology.
A.S., Cabrillo College, 1971; B.S., Oregon State, 1972.

KENTON LEE CHAMBERS (1960)
Professor of Botany; Curator of Herbarium.
A.B., Whittier, 1950; Ph.D., Stanford, 1956.

CHENG-CHENG CHANG (1968)
Assistant Professor of Electrical and Computer Engineering.
B.S., Taiwan University, 1959; M.E.E., Oklahoma, 1963; Ph.D., California (Berkeley), 1968.

MICHAEL H. CHAPLIN (1968)
Associate Professor of Horticulture.
B.S., Kentucky, 1965; M.S., Rutgers, 1966; Ph.D., Michigan State, 1968.

BERKLEY WARNER CHAPPELL (1963)
Professor of Art.
B.F.A., University of Colorado, 1956, M.F.A., 1958.

HELEN GENEVA CHARLEY (1944)
Professor of Foods and Nutrition.
A.B., DePauw, 1930; M.S., Chicago, 1941.

GERALD T. CHEEK (1972)
Assistant Football Coach, Intercollegiate Athletics (Assistant Professor).
B.A., Central State College (Oklahoma), 1957.

PETER ROBERT CHEEKE (1969)
Assistant Professor of Animal Science.
B.S.A., British Columbia, 1963, M.S.A., 1965; Ph.D., Oregon State, 1969.

ROCKY WU-JER CHEN (1973)
Research Associate in Agricultural Chemistry.
B.S., National Taiwan Univ., 1965; M.S., Hawaii, 1969; Ph.D., Wisconsin, 1973.

HORACE BELLATTI CHENEY (1952)
Professor of Soil Science, Head of Department.
B.S., Iowa State, 1935; Ph.D., Ohio State, 1942.

ROBERT WILLIAM CHICK (1962)
Dean of Students, Professor of Education.
B.A., Missouri, 1946, M.Ed., 1950; Ed.D., Denver, 1960.

DAVID OWEN CHILCOTE (1953)
Professor of Crop Physiology.
B.S., Oregon State, 1953, M.S., 1957; Ph.D., Purdue, 1961.

WILLIAM WESLEY CHILCOTE (1950)
Professor of Botany.
B.S., Iowa State, 1943, Ph.D., 1950.

HERBERT ELLSWORTH CHILDS (1935)
Professor Emeritus of English.
A.B., Oberlin College, 1926; Ph.D., Washington, 1932.

KIM K. CHING (1961)
Professor of Forest Genetics.
B.S., Central University, China, 1942; M.F., Michigan State, 1948, Ph.D., 1954.

TE MAY TSOU CHING (1956)
Professor of Seed Physiology.
B.S., Central University, China, 1944; M.S., Michigan State, 1950, Ph.D., 1954.

HARBANS SINGH CHONA (1966)
Documents Librarian (Assistant Professor).
B.A., Punjab University, 1954; M.A. (L.S.), Peabody Library School, George Peabody College, 1961.

BERT EINAR CHRISTENSEN (1931)
Professor Emeritus of Chemistry.
B.S., Washington State, 1927; Ph.D., Washington, 1931.

DOROTHY JEAN CHRISTENSEN (1967)
Extension Agent (Assistant Professor).
B.S., Oregon State, 1967.

LENO VIRGIL CHRISTENSEN (1957)
Teacher Trainer in Agricultural Mechanics, Associate Professor of Agricultural Engineering.
B.Sc., Nebraska, 1941; M.S., Stout State University, 1966.

RICHARD WILLIAM CHRISTENSEN (1971)
Lt. Col. USAF; Associate Professor of Aerospace Studies.
B.S., U.S. Military Academy, 1953; M.S., Southern California, 1966.

JOHN JEN-CHU CHU (1974)
Physician (Associate Professor), Student Health Center.
B.Sc., M.D., Penn. Med. School.

CLARENCE LEWIS CHURCH (1943-44, 1945)
Assistant Professor Emeritus of Physics.
A.B., Willamette, 1927; M.A., Southern California, 1936.

DAVID CALVIN CHURCH (1956)
Professor of Animal Nutrition.
B.S., Kansas State, 1950; M.S., Idaho, 1952; Ph.D., Oklahoma State, 1956.

THOMAS EDWARD CHURCH (1969)
Josephine County Extension Agent. (Instructor).
B.S., Idaho, 1969.

ROBERT RAYMOND CLAEYS (1967)
Assistant Professor (Courtesy), Engineering Experiment Station.
B.S., Univ. of Portland, 1960; Ph.D., Oregon State, 1968.

AVA MILAM CLARK (1911)
Professor Emeritus of Home Economics.
Ph.B., Chicago, 1910, M.A., 1911, Dean of the School of Home Economics 1917-50.

ELSIE K. CLARK (1960)
Polk County Extension Agent, Home Economics (Associate Professor).
B.S., New Mexico State, 1942; M.HEc, 1971.

GLENN EDWIN CLARK (1968)
Associate Professor of Education; Coordinator of Programs in Counseling and Guidance.
B.S., Nebraska, 1941, M.A., 1948; Ed.D., Wyoming, 1964.

HARRY EDWIN CLARK (1951)
Extension Community Development Specialist (Professor Emeritus).
B.S., Oregon State, 1939, M.S., 1942; Ph.D., Wisconsin, 1960.

LEAH ANN MILLER CLARKE (1971)
Instructor in Family Life.
B.A., Marshall, 1970; M.S., Penn State, 1971.

RONALD O. CLARKE (1963)
Professor of Religious Studies.
B.S., Oregon State, 1950; B.D., Yale, 1953; Th.D., Pacific School of Religion, 1964.

ALBIRDA STEWART CLAY (1972)
Assistant Professor of Education.
B.S., Jackson State College, 1956; M.Ed., Connecticut, 1972. On leave.

DONALD WEDSEL CLAYPOOL (1964)
Assistant Professor of Animal Science.
B.S., Berea, 1952; M.S., Kentucky, 1959.

BRIAN DENNIS CLEARY (1973)
Extension Reforestation Specialist (Assistant Professor).
B.S., Oregon State, 1965, M.S., 1966, Ph.D., 1970.

LAURA MAE CLEAVELAND (1946)
Associate Professor Emeritus of Institution Management.
B.S., Iowa State, 1930; M.S., Oregon State, 1942.

STEVEN DOUGLAS CLEMENT (1970)
Marion County Extension Agent (Instructor), 4-H and Youth.
B.S., Southern Oregon College, 1970.

SCOTT PHILIP CLEVENGER (1945)
County Extension Agent-at-Large (Assistant Professor Emeritus).
B.S., Oregon State, 1939.

AUSTIN MICHAEL COLBERT (1969-71, 1972)
Oregon Coordinator of Adult Education Staff Development (Assistant Professor).
B.S., Oregon, 1955; M.S., Oregon College of Education, 1958; Ed.D., Oregon State, 1971.

SAMUEL LEROY COLE (1970)
Assistant Professor of Speech Communication.
B.S., State University of N.Y. at Geneseo, 1966; M.A., Maryland, 1968; Ph.D., Pennsylvania State, 1971.

RALPH ORVAL COLEMAN (1919)
Professor Emeritus of Physical Education.
B.S., Oregon State, 1918; M.A., Columbia, 1929.

BARBARA MARGARET COLES (1973)
Assistant Professor of Veterinary Medicine.
B.S.A., British Columbia, 1949, M.Sc., 1969; Ph.D., Washington State, 1972.

OLIVER CECIL COMPTON (1948)
Professor Emeritus of Horticulture.
B.S., California, 1931, M.S., 1932; Ph.D., Cornell, 1947.

EDWARD J. CONDON (1972)
Extension Oceanographer (Instructor).
B.A., Nebraska, 1951.

HARLAN D. CONKEY (1969)
Associate Professor of Speech Communication (Audiologist).
B.S., Kansas, 1959, M.S., 1961; Ed.D., Tulsa, 1969.

FRANK SIDNEY CONKLIN (1968)
Associate Professor of Agricultural Economics.
B.S., Oregon State, 1954, M.S., 1959; Ph.D., Iowa State, 1968.

MELVIN J. CONKLIN (1926-39, 1950)
Associate Professor Emeritus of Agricultural Economics. Agricultural Experiment Station.
B.S., Montana State, 1922.

JOHN RICHARD CONNELLY (1970)
Assistant Professor of Family Life.
B.S., Brigham Young University, 1964. M.S., 1968; Ph.D., Penn State, 1970.

HELEN DWELLE CONNER (1963)
Malheur County Extension Agent, Home Economics (Assistant Professor).
B.S., Montana, 1963.

PATRICK E. CONNOR (1971)
Assistant Professor of Business Administration.
B.S.E.E., Washington, 1962; M.S.I.A., Purdue, 1965; Ph.D., Washington, 1970.

DIANA KAY CONRAD (1970)
Assistant Dean of Students (Instructor).
B.S., Idaho, 1959; M.Ed., Western Washington State, 1970.

GEORGE HARMON CONSTANTINE, JR. (1966)
Associate Professor of Pharmacognosy.
B.S. in Pharmacy, Utah, 1960, M.S., 1962; Ph.D., Oregon State, 1966.

FRANK PHILIP CONTE (1961)
Professor of Zoology.
A.B., California, 1950, Ph.D., 1961.

RICHARD HUGO CONVERSE (1967)
Professor of Plant Pathology (Courtesy); Research Plant Pathologist, USDA.
B.S., California (Berkeley), 1947, M.S., 1948; Ph.D., California (Davis), 1951.

CURTIS ROGER COOK (1970)
Assistant Professor of Computer Science.
B.A., Augustana College, 1965; M.S., Iowa, 1967, Ph.D., 1970.

GORDON HENRY COOK (1965)
Sherman County Extension Chairman (Instructor).
B.S., Oregon State, 1964.

WILBUR TARLTON COONEY (1937)
Dean of Agriculture, Professor of Poultry Science.
B.S., Oregon State, 1937, M.S., 1942.

PETER J. COPEK (1972)
Assistant Professor of English.
B.S., Loyola (Chicago), 1967; M.A., Northwestern, 1969, Ph.D., 1973.

ELAINE JOHNSON COPELAND (1970)
Counselor, Counseling Center and Equal Opportunity Program (Instructor).
B.S., Livingston College, 1964; M.A.T., Winthrop College, 1971.

RONALD HAROLD COPELAND (1972)
Associate Professor of Health (Courtesy).
B.A., Colorado, 1959; M.D., University of Colorado Medical School, 1963.

DONALD LOUIS COPES (1964)
Assistant Professor (Courtesy), Forestry Sciences Laboratory.
B.S., Purdue, 1961; Ph.D., Idaho, 1967.

MALCOLM ERNEST CORDEN (1958)
Professor of Plant Pathology.
B.S., Oregon State, 1952, Ph.D., 1955.

STANLEY EUGENE CORDER (1961)
Associate Professor of Forest Products (Mechanical Engineer).
B.S., Oregon State, 1950, M.S., 1967.

CLIFFORD BERNARD CORDY (1935)
Jackson County Extension Chairman (Professor Emeritus).
B.S., Oregon State, 1930; M.S., Michigan State, 1934; Ph.D., Florida, 1961.

JOHN BURT CORLISS (1970)
Assistant Professor of Oceanography.
B.S., Arizona State, 1958; Ph.D., Scripps Institution of Oceanography, 1970.

CHARLES WILLIAM CORMACK (1963)
Professor of Anthropology.
A.B., California at Los Angeles, 1937; M.S. (Econ.), University of London, 1939; Ph.D., Arizona, 1968.

EVERETT STEWART CORTRIGHT (1944)
Professor Emeritus of Speech Communication.
B.A., Iowa State Teachers, 1927; M.A., Michigan, 1941.

RICHARD WILLIAM COUCH (1966)
Associate Professor of Geophysical Oceanography.
B.S., Michigan State, 1958; M.S., Oregon State, 1963, Ph.D., 1969.

E. WAYNE COURTNEY (1972)
Professor and Coordinator of Vocational Education.
B.S.F., Purdue, 1953, B.S., 1957, M.S., 1958, Ph.D., 1962.

BELVA HIGHT COVEY (1957)
Linn County Extension Agent, Home Economics (Associate Professor).
B.A., Penn College, Iowa, 1928. Retired.

JOHN RITCHIE COWAN (1948)
Professor of Agronomy; Head, Agronomic Crop Science.
B.S.A., Toronto, 1939; M.S., Minnesota, 1942, Ph.D., 1952.

LLOYDA THOMPSON COWLEY (1972)
Instructor in Biology (General Science).
B.A., San Jose State, 1952; M.A., California State at San Jose, 1972.

JOSEPH ALFRED COX (1946)
Professor Emeritus of Physical Education.
B.A., Colorado College, 1926; M.S., Oregon State, 1938.

JOSEPH REW COX (1945-50, 1957)
Associate Dean of Agriculture; Director, Extension Service (Professor).
B.S., Oregon State, 1939; M.S., Pacific University, 1964.

DUANE LEE COYIER (1961)
Associate Professor of Plant Pathology; Research Plant Pathologist.
B.S., Wisconsin, 1951, Ph.D., 1961.

GARVIN DUDLEY CRABTREE (1958)
Associate Professor of Horticulture.
B.S., Oregon State, 1951; M.S., Cornell, 1955, Ph.D., 1958.

PRISCILLA HORNING CRABTREE (1963 intermittant)
Assistant Professor of Home Management.
B.S., Oregon State, 1956; M.S., Cornell, 1961; Ph.D., Oregon State, 1966.

IRENE LOUISE CRAFT (1944)
Serials Librarian (Associate Professor).
B.S., Fort Hays State, 1930; M.A., Nebraska, 1931; B.S. (Lib. Sci.), Illinois, 1941, M.S. (Lib. Sci.), 1943.

GRETCHEN CRAFTS (1973)
Instructor in English.
B.A., California at Riverside, 1965, M.A., 1966; M.S., California State at San Diego, 1972.

RICHARD P. CRAIG (1974)
Assistant to the Director, Extension Service (Assistant Professor).
B.B.A., Woodbury College, 1960.

ROBERT VERNON CRAIG (1970)
Senior Instructor in Civil Engineering.
B.S., USC, 1960; M.S., Oregon State, 1972; Lic. Structural Engr.

RICHARD PRICE CRAMER (1957)
Assistant Professor of Physical Education.
B.S., Oregon State, 1957, M.S., 1961.

GENE FRANCIS CRAVEN (1958)
Associate Professor of Science Education and of Physical Science, (General Science).
B.S., Kansas State College (Pittsburg), 1954; M.S., Oregon State, 1958, Ph.D., 1966.

DAVID L. CRAWFORD (1964)
Associate Professor of Food Science and Technology, Program Director, Seafoods Laboratory, Astoria.
B.S., Oregon State, 1958, M.S., 1961, Ph.D. 1966.

PHILLIP ELLIS CRAWFORD (1967)
Instructor in Forestry, Associate Director of Self-Learning Center.
B.S. (Forestry), Oregon State, 1965, B.S. (Business), 1966, M.B.A., 1967.

MICHAEL OTTO CREIGHTON (1969)
Assistant Professor of Sociology.
B.A., Cornell College, 1964; M.A., Northern Illinois University, 1968; Ph.D., Iowa State, 1972.

HENRY CREW (1970)
Research Associate in Oceanography.
B.A., Pomona College, 1955; M.S., Washington, 1958; Ph.D., Texas A & M, 1970.

GRAYDON TALMADGE CREWS (1948)
Professor Emeritus of Physical Science (General Science).
B.S., Washington, 1938; M.S., Oregon State, 1950, Ed.D., 1957.

PATRICIA COX CREWS (1973)
Instructor in Clothing, Textiles and Related Arts.
B.S., Virginia Polytechnic Inst. & State Univ., 1971; M.S., Florida State, 1973.

LLOYD EARLE CRISP (1972)
Professor and Chairman of Speech Communication.
B.A., San Francisco State, 1958, M.A., 1960; Ph.D., University of Denver, 1967. Postdoctoral fellowship, Langley Porter Neuropsychiatric Institute and the Standford Research Institute, 1968-69.

JOSEPH ROBERT CROCKER, JR. (1962)
Assistant Professor of English.
A.B., Washington University, 1932, M.A., 1933.

HOWARD LESTER CROFF (1957)
Assistant Professor of Industrial and General Engineering.
B.S., Oregon State, 1942.

WILLIAM RAMSDEN CROOKS (1947)
Professor and Chairman of Psychology.
A.B., California, 1937; M.A., Connecticut, 1939; Ph.D., Minnesota, 1952.

MYRON GEORGE CROPSEY (1946)
Professor of Agricultural Engineering.
B.S., California, 1933; M.S., North Dakota Agricultural College, 1941; Ph.D., Michigan State, 1956.

FRANK RICHARD CROSS (1969)
Associate Professor of Education.
B.A., Wyoming, 1956, M.Ed., 1962, Ed.D., 1965.

HAMBLIN HOWES CROWELL (1946)
Professor of Entomology.
B.S., Oregon State, 1935, M.S., 1937; Ph.D., Ohio State, 1940.

WILLIAM KENNETH CROZIER, JR. (1966)
Professor and Chairman of Art.
B.F.A., Washington State, 1954; M.F.A., Washington, 1959.

DONNA F. CRUSE (1970)
Assistant Professor of Psychology.
B.S., Colorado State University, 1965; M.S., Massachusetts, 1967, Ph.D., 1970.

CHARLES CULBERSON (1972)
Research Associate in Oceanography.
B.S., Washington, 1965; M.S., Oregon State, 1968, Ph.D., 1972.

ELAINE MARIE CULL (1972)
Instructor, Summer Term and Continuing Educational Services.
B.A., Rosary College, 1969.

PAUL CULL (1970)
Assistant Professor of Computer Science and Mathematics.
B.S., Providence College, 1965; Ph.D., Chicago, 1970.

ANDREW JACKSON CULVER, JR. (1950)
Associate Plant Pathologist (Courtesy Associate Professor of Plant Pathology), Environmental Protection Agency P.R.D.
B.A., Delaware, 1943; M.S., Vermont, 1948.

ELIZABETH SIMPSON CURL (1972)
Instructor in Mathematics.
A.B., Western Maryland, 1952.

HERBERT CHARLES CURL (1961)
Professor of Oceanography.
B.S., Wagner College, 1950; M.S., Ohio State, 1951; Ph.D., Florida State, 1956.

DONALD DORRANCE CURRAN (1971)
Instructor in Microbiology.
B.S., Washington, 1956; M.S., California, 1964.

RAYMOND ALAN CURRIER (1961)
Associate Professor of Forest Products.
B.S., Massachusetts, 1950; M.S., New York State College of Forestry, 1952.

MELVIN CUTLER (1963)
Professor of Physics.
B.S., City College of New York, 1943; A.M., Columbia, 1947, Ph.D., 1951.

NORMAN H. CUTSHALL (1969)
Research Associate in Oceanography.
B.S., Oregon State, 1961, M.S., 1963, Ph.D., 1967.

HANS JUERGEN DAHLKE (1963)
Associate Professor of Mechanical Engineering.
B.S., San Diego State, 1957; M.S., Stanford, 1958, Ph.D., 1964.

JOAN MARIE DAHLKE (1970)
Instructor in Speech Communication.
A.B., Stanford, 1959; M.A., Oregon State, 1971.

OTTO PAUL HERMAN DAHLKE (1973)
Professor of Mechanical and Metallurgical Engineering (Courtesy).
B.S., College Mittweida (Germany), 1924.

CHARLES HENRY DAILEY, JR. (1947)
Professor of Physical Education.
B.S., North Central College (Illinois), 1943; M.A., Michigan, 1947.

E. LAWRENCE DALE (1971)
Assistant Professor of Education.
B.A., Idaho State, 1956; M.Ed., Oregon, 1964; Ed.D., Washington State, 1968.

ROBERT D. DALE (1965)
Assistant Professor of Philosophy.
B.S., Oregon State, 1957; M.A., Chicago, 1959; Ph.D., California at Berkeley, 1973.

CLIFFORD SHERMAN DALTON (1971)
Instructor in Business Administration; Assistant to the Dean; Director of Management Programs.
B.S., Oregon State, 1966, M.B.A., 1969.

CHARLES WESLEY DANE (1957)
Professor of Business Administration.
B.S.F.E., Oregon State, 1952, M.S., 1958, Registered Professional Engineer, 1960; D.B.A., Indiana, 1968.

MALCOLM DANIELS (1965)
Professor of Chemistry, Radiation Center.
B.Sc. (Hons. Chem.), Kings College, University of Durham, 1951, Ph.D., 1955.

RICHARD JACOB DANIELS (1970)
Assistant Professor of English.
B.A., Ohio State, 1963, M.A., 1966; Ph.D., 1972.

HAROLD RODGER DANIELSON (1968)
Instructor in Agronomic Crop Science and Certification Assistant.
B.A., Montana State, 1961; M.S., Oregon State, 1973.

RICHARD ELDEN DANKLEFF (1963)
Associate Professor of English.
B.S., Columbia, 1949; M.A., Nebraska, 1954; Ph.D., Chicago, 1959. On leave 1972-74.

JOSEPH A. D'ANNA, JR. (1971)
Research Associate in Biochemistry and Biophysics.
B.S., Southeastern Louisiana, 1965; Ph.D., Louisiana State, 1969.

ERNEST JULIUS DASCH, JR. (1970)
Assistant Professor of Geology.
B.S., Sul Ross State, 1956; M.A., Texas, 1959; M.S. Yale, 1967, Ph.D., 1969.

GARY EDWARD DATERMAN (1969)
Research Entomologist and Project Leader, USFS, Forestry Sciences Laboratory; Assistant Professor of Entomology (Courtesy).
B.A., California at Davis, 1962; M.S., Oregon State, 1964, Ph.D., 1969.

THOMAS PARNELL DAVIDSON (1950)
Assistant Professor of Horticulture, Superintendent, Umatilla Experiment Station.
B.S., Oregon State, 1949.

WILLIAM DENNIS DAVIDSON (1966-1970, 1972)
Extension Seafood, Meat and Poultry Specialist (Associate Professor).
B.S., Minnesota, 1959; M.S., 1962, Ph.D., 1966.

WILLIAM ALBERT DAVIES (1946)
Professor of Forest Engineering.
B.S.F., Washington, 1938, M.F., 1946.

DIANE FOURNET DAVIS (1969)
Research Associate in Physics (Courtesy).
B.A., Tulane, 1950; M.S., M.I.T., 1952, Ph.D., 1957.

GERALD EVERT DAVIS (1962)
Associate Professor of Fisheries.
B.S., Washington, 1956; M.S., Oregon State, 1960, Ph.D., 1963.

HOWARD FRED DAVIS (1968)
Associate Professor of Physics.
B.S., M.S., MIT, 1954; Ph.D., Rochester, 1960.

JOEL DAVIS (1963)
Associate Professor of Mathematics and Computer Science.
B.A., Princeton, 1957; M.S., Wisconsin, 1961, Ph.D., 1965. On sabbatical 1973-74.

JOHN LAURENCE DAVIS (1970)
Instructor in Agricultural Chemistry.
A.B., Centre College, 1965; Ph.D., North Carolina, 1970.

JOHN ROWLAND DAVIS (1971)
Professor and Head of Agricultural Engineering.
B.S., Minnesota, 1949, M.S., 1951; Ph.D., Michigan State, 1959.

LINDA M. DAVIS (1969)
Marion County Extension Agent, 4-H and Youth (Assistant Professor).
B.S., Andrews University, 1964.

LORIN RICHARD DAVIS (1969)
Associate Professor of Mechanical Engineering.
B.A., BYU, 1958, B.E.S.M.E., 1959; M.S.M.E., Purdue, 1961; Ph.D., Illinois, 1964.

PHILIP BARR DAVIS (1958)
Professor of Agricultural Education, Head Teacher Trainer.
B.S., Oklahoma State, 1950, M.S., 1953; Ph.D., Michigan State, 1959.

RONALD ALLAN DAVIS (1967)
Research Associate, Computer Center; Manager, Operations and Applications Programming.
B.S., Oregon State, 1959.

WILBUR ARTHUR DAVIS (1966)
Professor of Anthropology; Curator of Anthropology.
B.A., Reed College, 1949; M.A., Oregon, 1956, Ph.D., 1962.

MELISSA MARTIN DAWES (1915)
Professor Emeritus of Modern Languages.
A.B., Oregon, 1912; B.S., Oregon State, 1915; A.M., Columbia, 1920.

MURRAY DRAYTON DAWSON (1954)
Professor of Soil Science.
M.Agr.Sc., University of New Zealand, 1949, M.S., 1952; Ph.D., Cornell, 1954.

PETER SANFORD DAWSON (1969)
Associate Professor of Zoology.
B.S., Washington State, 1960; Ph.D., California (Berkeley), 1964.

ROBERT HAROLD DAWSON (1968)
Agricultural Economist (Courtesy Instructor) Economic Research Service, USDA.
B.A., University of Washington, 1957.

PAUL EDWARD DAY (1972)
Lane County Extension Agent (Instructor).
B.S., Oregon State, 1964, M.S., 1971.

GLEN DAVID DEALY (1967)
Associate Professor of Political Science.
B.A., Washington, 1957; M.A., George Washington University, 1958; Ph.D., California (Berkeley), 1965.

JOHN COURTNEY DECIUS (1949)
Professor of Chemistry.
A.B., Stanford, 1941, M.A., 1944; Ph.D., Harvard, 1947.

FRED WILLIAM DECKER (1946)
Associate Professor of Atmospheric Sciences.
B.S., Oregon State, 1940; M.S., New York, 1943; Ph.D., Oregon State, 1952.

CHARLES A. De DEURWAERDER (1967)
Professor of Landscape Architecture.
B.S., Massachusetts, 1953; M.L.A., 1957.

ANNE O'CONNELL DEENEY (1964)
Research Associate in Agricultural Chemistry.
B.S., Marylhurst College, 1948; M.S., Oregon State, 1959, Ph.D., 1963.

MAX L. DEINZER (1973)
Research Associate in Agricultural Chemistry.
B.S., Rutgers, 1960; M.S., Arizona, 1963; Ph.D., Oregon, 1969.

CARROLL WAYNE De KOCK (1967)
Associate Professor of Chemistry.
B.S., Calvin College, 1960; Ph.D., Iowa State, 1965.

WILLIAM CLARK DENISON (1966)
Associate Professor of Botany, Curator of Mycological Herbarium.
A.B., Oberlin College, 1950, A.M., 1952; Ph.D., Cornell University, 1956.

ROBERT LEE DENNIS (1969)
Assistant Professor of Botany.
A.A., Mt. Vernon Junior College, 1962; B.A., Southern Illinois University, 1964; M.S., Iowa, 1966, Ph.D., 1972.

ROLAND deSZOEKE (1973)
Research Associate in Oceanography.
B.Sc., Univ. of New South Wales, 1967, M.Sc., 1971; Ph.D., Nova Univ., 1973.

GEORGE WILLIAM DEWEY (1944)
Extension Specialist in Certification, (Assistant Professor Emeritus).
B.S., Michigan State, 1911.

ERNEST MILTON DICKINSON (1927-36, 1938)
Professor Emeritus of Veterinary Medicine.
D.V.M., Ohio State, 1927; M.S., Oregon State, 1935.

R. VERN DICKINSON (1968)
Assistant Professor of Physical Education.
B.S., UCLA, 1961, M.S., 1962; Ph.D., USC, 1970.

MARIE DIEDESCH (1945)
Associate Professor of Clothing, Textiles, and Related Arts.
B.A., Washington State, 1933; M.S., Oregon State, 1941.

WOLFGANG OTTO DILL (1970)
Assistant Professor of German, Modern Languages.
B.A., California at Riverside, 1967; M.A., California at Davis, 1968, Ph.D., 1972.

JOHN RICHARD DILWORTH (1946)
Professor and Head of Forest Management.
B.S., Iowa State, 1937, M.S., 1938; Ph.D., Washington, 1956.

JOHN RICHARD DILWORTH, JR. (1968)
Extension Certification Assistant (Instructor).
B.S., Oregon State, 1967.

ROLAND EUGENE DIMICK (1929)
Professor Emeritus of Fisheries.
B.S., Oregon State, 1926, M.S., 1931.

CHARLES GRAYSON DIMON (1973)
Professor of Naval Science; Captain USN.
B.A., U.S. Naval Post Graduate School, 1967; M.S., George Washington, 1971.

RUSSELL GROVER DIX (1964)
Assistant Registrar (Assistant Professor).
B.S., Oregon State, 1962; M.F., 1964.

JEANETTE ALICE DIXON (1930-48, 1958)
Associate Professor of Physical Education.
B.S., Battle Creek College, 1930; M.S., Oregon State, 1940.

ROBERT F. DOERGE (1960)
Assistant Dean of Pharmacy; Professor and Head of Pharmaceutical Chemistry.
B.S., Minnesota, 1943, Ph.D., 1949.

THOMAS MARSHALL DOGGETT (1965)
Broadcast Manager KOAC AM-TV, KOAP FM-TV (Assistant Professor), Oregon Educational and Public Broadcasting Service.
B.S., Oregon, 1960.

DAVID T. DOHERTY (1970)
Administrative Coordinator (Instructor) Residence Programs.
B.S., Oregon State, 1965, Ed.M., 1966.

MICHAEL W. DOLBY (1968)
Assistant Football Coach, Intercollegiate Athletics (Instructor).
B.S., Oregon State, 1962, M.S., 1967.

THURSTON ERMON DOLER (1949)
Professor of Speech Communication.
B.A., Furman, 1948; M.S., Purdue, 1949; Ph.D., Oregon, 1968.

JOHN RUSSELL DONALDSON (1966)
Associate Professor of Fisheries.
B.S., Washington, 1951, M.S., 1954. Ph.D., 1966.

ROBERT MAXWELL DONNELL (1972)
Associate Director of Libraries (Associate Professor).
B.S., Arizona State, 1950; M.A., University of Denver, 1962.

MARGARITA PATRICIA DONNELLY (1973)
Academic Coordinator, Special Services Program (Instructor).
B.A., San Francisco State, 1967.

HARRISON L. DOOLEY (1965)
Assistant Professor of Botany & Plant Pathology (Courtesy), Environmental Protection Agency TSD (Laboratory Supervisor and Plant Pathologist).
B.S., Oklahoma State, 1954, M.S., 1961.

ROBERT WINSTON DORMINEY (1968)
Assistant Professor of Poultry.
B.S., Florida, 1964, M.S., 1965; Ph.D., Auburn University, 1968.

HAROLD CLARENCE DORN (1965)
Professor of Journalism.
B.A., Nebraska, 1950, M.A., 1955.

ERNST JOHN DORNFELD (1938)
Professor and Chairman of Zoology.
B.S., Marquette, 1933; M.A., Wisconsin, 1935, Ph.D., 1937.

JEANNE DOST (1973)
Director, Office of Women's Studies; Associate Professor of Economics.
B.A., Washington State, 1951; A.M., Radcliffe, 1953; Ph.D., Harvard, 1959.

FRANK NORMAN DOST (1962)
Research Associate, Environmental Health Sciences Center, Associate Professor of Veterinary Medicine (Courtesy rank).
D.V.M., Washington State, 1951, B.S., 1953; M.S., Kansas State, 1959.

DOUGLAS JAY DOUBLEDAY (1970)
Professor and Chairman of Political Science.
B.A., California at Berkeley, 1950; Ph.D., 1958.

EVE-MARY DOUDOROFF (1960-61, 1963)
Assistant Professor of French and German, Modern Languages.
B.A., Incarnate Word College (San Antonio), 1957, M.A., 1959.

PETER DOUDOROFF (1953)
Professor of Fisheries.
A.B., Stanford, 1935; Ph.D., California, 1941.

JAMES MARLIN DOUGLASS (1968)
Associate Professor of Music, Director of Bands.
B.M.E., University of Denver, 1960; M.F.A., Ohio, 1962.

RIZPAH ANNA DOUGLASS (1949)
Josephine County Extension Agent, Home Economics (Associate Professor Emeritus).
B.S., Nebraska, 1923; M.A., Columbia, 1938.

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Physician, Student Health Center, (Associate Professor).
B.S., Minnesota, 1943, M.B., 1944, M.D., 1945.

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Assistant Professor of Forest Management.
B.S., Colorado State, 1962, M.S., 1966; Ph.D., Missouri, 1973.

CHRISTOPHER ROYDEN DOWSWELL (1973)
Area Extension Agent, Community Development (Instructor).
B.A., Colorado, 1971.

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B.S., Maine, 1950; M.A., Wesleyan (Conn.), 1952; Ph.D., Yale, 1958.

KARL FRANCIS DRLICA (1950)
Associate Professor of Physical Education; Coach of Rowing.
B.S., Oregon State, 1941, M.S., 1952.

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Instructor in Speech Communication.
B.A., San Francisco State, 1970, M.A., 1972.

MARVIN CLARENCE DUBBÉ (1952)
Associate Professor Emeritus of English.
B.S., Columbia, 1929, M.A., 1932; Ed.D., Oregon State, 1956.

JAMES WESLEY DUNN (1963)
University Development Officer (Associate Professor), President's Office.
B.S., Oregon State, 1951; M.S., New York U., 1952.

JOHN ASHER DUNN (1969)
Associate Professor of Anthropology.
B.A., St. John's University (Minnesota), 1964; Ph.D., New Mexico, 1970.

PAUL MILLARD DUNN (1942)
Professor of Forestry (Courtesy).
B.S., Iowa State, 1923, M.S., 1933.

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A.A., Wenatchee Valley Coll., 1956; B.S., Washington State, 1960, M. Ext., 1973.

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B.M.E., Central Missouri State, 1958, M.S., 1961; Ph.D., Wyoming, 1966.

MARVIN LYLE DURHAM (1970)
Foreign Student Adviser, International Education (Associate Professor).
B.S., Washington, 1952; M.A., Fletcher School of Law and Diplomacy, 1953, Ph.D., 1962.

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Associate Professor of Oceanography.
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CHRISTEN THEODORE DYRNESS (1960)
Principal Soil Scientist, U.S. Forest Service (Courtesy Associate Professor).
B.S., Wheaton College, 1954; M.S., Oregon State, 1956, Ph.D., 1960.

ROBERT DUANE DYSON (1967)
Associate Professor of Biochemistry and Biophysics.
B.A., Oregon, 1961; M.S., Illinois, 1963, Ph.D., 1965.

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Instructor in Forest Engineering.
B.S., Oregon State, 1966; M.B.A., Oregon, 1971.

DOROTHY MAY EAST (1961)
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Professor of Physics.
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EDISON ELLSWORTH EASTON (1951)
Professor of Business Administration.
B.S., Southern California, 1947; M.B.A., California, 1951; C.P.A., Oregon and California; D.B.A., Southern California, 1967.

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Support Services Coordinator, Special Services Program (Instructor).
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ARNOLD CHRISTIAN EBERT (1936)
Extension Broadcast Communication Specialist (Associate Professor Emeritus).
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Professor Emeritus of Clothing, Textiles, and Related Arts.
B.S., Iowa State, 1925; M.A., Columbia, 1939.

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Professor of Agricultural Economics.
B.S. (Agric.), Wisconsin, 1950; M.A., Nebraska, 1952; Ph.D., Chicago, 1963.

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University Placement Coordinator; Associate Professor of Business Administration.
B.S., Montana State, 1935; M.E., Montana, 1949.

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Assistant Professor of Music.
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Dipl. Agr., Munich Polytech, 1955; M.S., Purdue, 1957, Ph.D., 1959.

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Professor and Chairman of Microbiology.
B.S., Wisconsin, 1934, M.S., 1935, Ph.D., 1937.

DON ROBERT ELLINWOOD (1970)
Visiting Instructor in Economics.
B.S., Bradley, 1968; M.S., Oregon, 1971.

WILLIAM PAUL ELLIOTT (1968)
Research Associate in Oceanography.
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JAMES O. ELLIS (1973)
Instructor in Military Science, Staff Sergeant, U.S. Army.

JOHN KENNETH ELLIS (1964)
Associate Professor of Health.
B.Ed., Southern Illinois, 1943, B.S., 1944; M.P.H., Michigan, 1948, Ph.D., 1963.

RUSSELL EUGENE ELLIS, AIA (1949)
Professor of Architecture.
B.S., Washington State, 1949, B.Arch.E., 1952. Architect, 1956.

JOSEPH WALDO ELLISON (1924)
Professor Emeritus of History.
A.B., California, 1917, M.A., 1919, Ph.D., 1923.

EUGENE ELZY (1964)
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B.S., Illinois, 1961; Ph.D., Oregon State, 1966.

EMILY MARGARET EMERSON (1973)
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B.A., Texas Tech, 1970, M.A., 1973.

MARY MILLER ENGESSER (1946, 1957, and since 1963)
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B.A., Western Maryland College, 1943; Ed.M., Oregon State, 1963.

WILLIAM FREDERICK ENGESSER (1941)
Professor of Industrial and General Engineering.
B.S., Northwestern, 1941, M.S., 1950.

DAVID CHARLES ENGLAND (1955)
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B.S., Washington State, 1949; M.S., Minnesota, 1950, Ph.D., 1952.

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Professor of Electrical and Computer Engineering.
B.S., Oregon State, 1947, M.S., 1951, E.E., 1958.

HAROLD EUGENE ENLOWS (1963-64)
Professor and Chairman of Geology.
B.S., Tulsa, 1935; M.S., Chicago, 1936; Ph.D., Arizona, 1939; Aerological Engineer, United States Naval Academy, 1944.

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LEE ROY ERICKSON (1974)
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FLORENCE SARAH EUREN (1946-49, 1957)
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B.E., Moorhead State Teachers College, 1937; B.S. (Lib. Sc.), Minnesota, 1946.

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Extension Communication Specialist (Associate Professor); Chairman, Extension Communication; Associate Professor of Journalism.
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Professor of Plant Physiology.
B.S., Kentucky, 1946, M.S., 1948; Ph.D., Rutgers, 1950.

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Chairman and Associate Professor of Science Education.
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FOREST EVASHEVSKI, JR. (1971)
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B.A., Michigan, 1965; J. D., Iowa, 1968.

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B.S., Rutgers, 1963, M.S., 1965; Ph.D., Florida, 1967.

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B.A., Fresno State, 1956; Ph.D., Washington, 1962.

SHENG CHUNG FANG (1948)
Professor of Chemistry, Agricultural Chemistry.
B.S., Fukien Christian University, 1937; M.S., Oregon State, 1944, Ph.D., 1948.

PAUL LAWRENCE FARBER (1970)
Assistant Professor of History of Sciences, General Science.
B.S., University of Pittsburgh, 1965; M.A., Indiana, 1968, Ph.D., 1970.

VRENELI REGULA FARBER (1972)
Instructor in Russian, Modern Languages.
B.A., University of Pittsburgh, 1964; M.A., Harvard, 1967.

DONALD H. K. FARNESS (1963)
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Assistant Professor of Economics.
B.S., Wisconsin, 1961, M.S., 1964, Ph.D., 1973.

WILLIAM KING FARRELL (1942)
Grant County Extension Chairman (Associate Professor).
B.S., Oregon State, 1942.

JOHN DAVID FAUDSKAR (1972)
Marine Extension Agent (Instructor).
B.S., Oregon State, 1969.

G. DAVID FAULKENBERRY (1965-69, 1971)
Associate Professor of Statistics.
B.S., Southeastern State College of Oklahoma, 1959; M.S., Oklahoma State, 1963, Ph.D., 1965.

MARY RUTH FECHTIG (1964)
Program Advisor (Assistant Professor) Memorial Union.
B.A., Southern Illinois, 1960; M.S. in Ed., 1963.

GRANT STEPHEN FEIKERT (1929)
Professor Emeritus of Electrical and Computer Engineering; Engineering Consultant to the Department of Educational Media and Broadcasting.
B.S., Oregon State, 1930, M.S., 1932, E.E., 1937.

BETTY LOU FEIN (1972)
Assistant Professor of Mathematics.
B.A., UCLA, 1961, M.A., 1963, Ph.D., 1967.

BURTON IRA FEIN (1970)
Associate Professor of Mathematics.
B.S., Polytech Inst. of Brooklyn, 1961; M.S., Wisconsin, 1962; Ph.D., Oregon, 1965.

ROGER KENNETH FENDALL (1968)
Assistant Dean of Agriculture, Head Adviser; Associate Professor of Agronomy.
B.S., Oregon State, 1960; Ph.D., North Dakota State, 1964.

GEORGE RAY FERGUSON (1973)
Professor of Entomology (Courtesy).
B.S., Oregon State, 1936, M.S., 1939; Ph.D., Ohio State, 1941.

GARY BURT FERNGREN (1970)
Assistant Professor of History.
B.A., Western Washington State, 1964; M.A., University of British Columbia, 1967; Ph.D., 1973.

FRANCISCO R. FERRAN (1965)
Assistant Professor of Spanish, Modern Languages.
B.A., Indiana State, 1965; LL.D., University of Havana, 1940; M.S., Indiana State, 1966.

WILLIAM KREITER FERRELL (1956)
Professor of Forest Management.
B.S.F., Michigan, 1941; M.F., Duke, 1946, Ph.D., 1949.

PETER FESSENDEN (1967)
Assistant Professor of Physics.
B.A., Williams College, 1959; Sc.M., Brown University, Ph.D., 1965. On leave 1973-74.

CYRUS WEST FIELD (1963)
Associate Professor of Geology.
B.A., Dartmouth, 1956; M.S., Yale, 1957, Ph.D., 1961.

WILLIAM RODNEY FIELDER (1971)
Professor of Education; Director, Division of Graduate Studies, School of Education.
B.A., San Jose State, 1952, M.A., 1956; Ed.D., Stanford, 1960.

MARGARET LOUISE FINCKE (1935)
Professor Emeritus of Foods and Nutrition.
A.B., Mount Holyoke, 1921; A.M., Columbia, 1932, Ph.D., 1935.

GREGORY B. FINK (1964)
Professor of Pharmacology.
B.S., Montana, 1950; Ph.D., Utah, 1960.

DAVID FRANCIS FINNIGAN (1957)
Associate Professor of English.
B.A., Colorado, 1956, M.A., 1957; Ph.D., Oregon, 1970.

WILLIAM JAMES FIREY (1961)
Professor of Mathematics.
B.S., Washington, 1948; M.A., Toronto, 1949; Ph.D., Stanford, 1954.

JAMES L. FIRTH (1973)
Assistant Professor of Education.
A.B., San Diego State, 1962; M.S., 1969.

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Extension Poultry Specialist (Associate Professor).
B.S., South Dakota State, 1943; M.S., Iowa State, 1947.

ERMINA JANE FISHER (1952)
Marion County Extension Agent, Home Economics (Professor Emeritus).
B.S., Kansas State, 1938; M.S., Cornell, 1951.

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Associate Professor of Fisheries.
B.A., Harvard, 1957, M.S., 1960.

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Assistant Professor of Agricultural Economics.
B.S., Stanford, 1961, M.A., 1972; M.S., Purdue, 1970.

LUTHER AARON FITCH (1960)
Umatilla County Extension Agent (Assistant Professor).
B.S. (Agr.), Idaho, 1956; M.S. (Agr.), Michigan State, 1960.

DUANE STANLEY FITZGERALD (1952)
Building Manager (Assistant Professor) Memorial Union.
B.S., Oregon State, 1940.

THOMAS JOHN FITZGERALD (1970)
Associate Professor of Chemical Engineering.
B.S., Illinois Tech, 1959, Ph.D., 1967.

FRANCIS JOSEPH FLAHERTY (1967)
Associate Professor of Mathematics.
B.A., Wisconsin, 1956; M.S., Notre Dame, 1959; Ph.D., California (Berkeley), 1965.

ARNOLD WILLIAM FLATH (1967)
Professor of Physical Education, Assistant Director of Division of Health and Physical Education.
B.S., Valley City State Teachers College, 1951; M.Ed., North Dakota, 1958; Ph.D., Michigan, 1963.

MARY GENEVIEVE FLETCHER (1959)
Douglas County Extension Agent, Home Economics (Associate Professor Emeritus).
B.S., Kansas State, 1928, M.S., 1934.

ROGER LEROY FLETCHER (1967)
Polk County Extension Agent (Instructor).
B.A., Elon College, North Carolina, 1964.

ELIZABETH O'BRIEN FLOOD (1954)
Assistant Professor Emeritus of Mathematics.
B.S., Oregon State, 1940, M.S., 1947.

GERHARD RAGNVALD FLOOD (1940-41, 1943)
Associate Professor Emeritus of Physical Education.
B.S., Oregon State, 1929, M.S., 1941.

RICHARD L. FLOYD (1970)
Editor, Agricultural Experiment Station Publications (Assistant Professor).
B.A., Indiana, 1949.

MAUD PURVINE FLUENT (1934)
Crook County Extension Agent (Associate Professor Emeritus).
B.S., Oregon State, 1933.

JAMES A. FOLTS (1972)
Instructor, Sea Grant College Program Editor of Journalism.
A.B., Princeton, 1966; B.A., B.A., Oregon State, 1972.

PETER ROBERT FONTANA (1967)
Associate Professor of Physics.
M.S., Miami University, 1958; Ph.D., Yale, 1960.

WILSON HOOVER FOOTE (1948)
Professor of Agronomy, Associate Director, Agricultural Experiment Station.
B.S., Utah State, 1942; M.S., Minnesota, 1946, Ph.D., 1948.

WALTER CYRIL FOREMAN (1948)
Professor and Chairman of English.
B.A., Union College (Nebraska), 1933; M.A., Nebraska, 1937; Ph.D., California, 1948.

JUDITH FORBES FOREST (1969)
Extension Food and Nutrition Specialist (Assistant Professor, Foods and Nutrition).
B.S., Pennsylvania State, 1964; M.S., Cornell, 1966.

HERMAN CARL FORSLUND (1945)
Professor Emeritus of Pharmacy.
B.S., Washington State, 1938, M.S., 1940.

LARRY GENE FORSLUND (1972)
Assistant Professor of Biology (General Science).
B.S., Wayne State, 1962; M.S., Creighton, 1968; Ph.D., Tulane, 1972.

LEE RUSSELL FOSTER (1947)
Hood River County Extension Chairman (Professor Emeritus).
B.S., Washington State, 1933.

ROY ARCHIBALD FOSTER (1955)
Professor of Health.
B.A., Concordia College, 1937; M.S., Indiana, 1950, H.S.D., 1953.

WILLIAM ABRAM FOSTER, JR. (1958)
Associate Professor of Sociology.
B.S., California, 1942; M.S., Cornell, 1947, Ph.D., 1958.

TED E. FOULKE (1955)
Medical Consultant, Student Health Service (Professor).
B.S., Case Institute of Technology, 1944; M.D., Western Reserve, 1951.

DOROTHY BOURKE FOX (1928)
Associate Professor Emeritus of Art.
B.A., California School of Arts and Crafts, 1925.

FRED WAYNE FOX (1957)
Professor of Science Education.
B.S.Ed., Miami University (Ohio), 1942; M.A., Ohio State, 1949, Ph.D., 1957.

WILLIAM TEMPLETON FOX (1973)
Professor (Courtesy) of Oceanography.
B.A., Williams College, 1954; M.S., Northwestern, 1961, Ph.D., 1962.

RODNEY VANCE FRAKES (1960)
Professor of Plant Breeding, Agronomic Crop Science.
B.S., Oregon State, 1956, M.S., 1957; Ph.D., Purdue, 1960.

THOMAS T. FRANCE (1969)
Assistant Director of Publications (Assistant Professor).
B.S., Iowa State, 1959.

ROBERT JOSEPH FRANK (1969)
Assistant Professor of English.
B.A., St. John's University, 1962; M.A., Minnesota, 1968, Ph.D., 1969.

WILLIAM FIELDING FRANK (1969)
Instructor in Philosophy and Mathematics.
B.A., Middlebury College, 1966; M.A., Chicago, 1968.

MICHAEL E. FRANKLIN (1969)
Research Chemist, National Council for Air and Stream Improvement (Courtesy Assistant Professor).
B.S., Oregon State, 1969.

JUDITH ANN FRATES (1973)
Instructor in English.
A.A., Sacramento City College, 1967; B.A., Sacramento State, 1969. M.A., 1971.

LLOYD McDONALD FRAZIER (1947)
Associate Professor, Manager of Instructional Shops, School of Engineering.
B.S., Oregon State, 1949; M.S., B.Y.U., 1968.

WILLIAM ALLEN FRAZIER (1949)
Professor Emeritus of Horticulture.
B.S., Texas A & M, 1930; M.S., Maryland, 1931, Ph.D., 1933.

WILLIAM J. FREDERICKS (1962)
Professor of Chemistry.
B.S., San Diego State, 1951; Ph.D., Oregon State, 1955.

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Professor of Chemistry; Head of Department of Agricultural Chemistry.
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Instructor in Naval Science.

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B.S., College of City of New York, 1940; M.S., Michigan, 1941, Ph.D., 1945.

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B.S., Washington State, 1960; M.A., Syracuse, 1968.

PIETER ANDRIES FRICK (1973)
Assistant Professor of Electrical and Computer Engineering.
B.Sc.B.Eng., Stellenbosch (South Africa), 1964; M. Eng, 1966; DIC, Imperial College (London), 1971; Ph.D., London, 1971.

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Professor of Economics.
B.A., Colorado, 1943, M.A., 1947, Ph.D., 1950.

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Jackson County Extension Agent, 4-H and Youth (Assistant Professor).
B.S., Nebraska, 1959; M.Ed., Colorado State University, 1966.

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Harney County Extension Chairman. (Assistant Professor).
B.S., Chico State, 1960; M.S., North Dakato State, 1964.

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Extension Animal Scientist (Professor).
B.S., Utah State, 1942, M.S., 1943.

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B.S.A., Saskatchewan, 1942; M.S., Wisconsin, 1955; Ph.D., 1966.

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HERBERT FARLEY FROLANDER (1959)
Professor of Oceanography.
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HORTON LAWRENCE FROSS (1963)
Director of Advising and Student Services, College of Liberal Arts (Associate Professor).
B.A., Sacramento State, 1954; M.Ed., Oregon State, 1966, Ph.D., 1969.

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B.S., Oregon State, 1956, M.S., 1957, Ph.D., 1964.

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Research Associate, Manager On-Line Hardware and Software Development, Computer Center.
B.S., Minnesota, 1963.

LESLIE H. FUCHIGAMI (1970)
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B.S., Hawaii, 1964; M.S., Minnesota, 1966, Ph.D., 1970.

WINNIFRED KEIL FULMER (1938)
Associate Professor Emeritus of Home Economics.
B.S., Iowa State, 1930, M.S., 1938.

EJNER JENS FULSANG, JR. (1972)
Professor of Military Science; Colonel, U. S. Army.
B.S., Troy State College, 1967; M.B.A., Oregon State, 1970.

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Assistant State Leader, Extension Home Economics (Professor Emeritus).
B.S., Oklahoma State University, 1942; M.S., Cornell, 1955.

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Professor of Political Science.
B.A., Florida, 1949, M.A., 1950, Ph.D., 1953.

CARI (CAROL) LEE GABIOU (1973)
Visiting Assistant Professor of Political Science.
B.A., Oregon, 1968, M.A., 1971.

EMILIO GAGLIARDO (1969)
Professor of Mathematics and Computer Science.
Laurea, Genova, Italy, 1953; Libera Docenza, Ministero Pubblica Instruzion, 1958.

JOEL DAVID GALLOWAY (1972)
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B.S., Iowa State, 1963; M.S., Illinois, 1967, Ed.D., 1972.

WILBERT GAMBLE (1962)
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B.S., Wayne State, 1955, Ph.D., 1960.

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ERNEST HUGH GARDNER (1966)
Extension Soil Science Specialist (Professor).
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Extension Timber Harvesting Specialist, Forest Engineering (Instructor).
B.S., Oregon State, 1970; M.S., Minnesota, 1972.

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Instructor in English.
B.Ed., Illinois State, 1943; M.A., Columbia, 1946.

EVRA ALTA GARRISON (1930)
Assistant Professor Emeritus of Foods and Nutrition.
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ROBERT LEON GARRISON (1960)
Assistant Professor of Fisheries (Courtesy); Aquatic Research Biologist, Research Division, Oregon Wildlife Commission.
B.S., Oregon State, 1959, M.S., 1961.

SHERIDAN TED GASHLER (1972)
Instructor in Animal Science.
B.S., Utah State, 1969.

DILLARD HERBERT GATES (1962)
Professor of Rangeland Resources; Director, Rangeland Resources Program; Extension Specialist.
B.S., Nebraska, 1952, M.S., 1953; Ph.D., Utah State, 1956.

RUTH ELIZABETH GATES (1969)
Associate Professor of Clothing, Textiles, and Related Arts.
B.S., Nebraska, 1942; M.S., Kansas State, 1948; Ph.D., Penn State, 1960.

FORREST JAMES GATHERCOAL (1969)
Associate Professor and Assistant Dean of Education.
B.Mus., Oregon, 1957, LL.B., 1966, J.D., 1971.

DOROTHY GATTON (1940)
Professor Emeritus of Clothing, Textiles, and Related Arts.
B.A., Washington, 1925, M.A., 1933.

CHARLES GERALD GAVIN (1955)
Wallowa County Extension Chairman (Associate Professor).
B.S., Wyoming, 1949.

HERMAN A. GAWER (1961)
Assistant Professor Emeritus of Health.
B.S., Oregon, 1929; M.A., New York University, 1931, Ed.D., 1951.

LLOYD WESLEY GAY (1966)
Associate Professor of Forest Climatology.
B.S., Colorado State University, 1955; Diploma of Forestry, Australian Forestry School, 1959; M.F., Duke University, 1962, Ph.D., 1966.

BENJAMIN GEBHART (1973)
Visiting Professor of Mechanical and Metallurgical Engineering.
B.S.M.E., Michigan, 1948, M.S.M.E., 1950; Ph.D., Cornell, 1954.

MICHAEL GEMPERLE (1965)
Instructor in Oceanography.
B.S., California (Berkeley), 1961.

LOUIS GUSTAVE GENTNER (1930)
Professor Emeritus of Entomology, Southern Oregon Experiment Station.
B.S., Oregon State, 1915; M.S., Wisconsin, 1918; Ph.D., Oregon State, 1953.

BETTY JUNE GEORGE (1971)
Instructor in Speech Communication.
B.S., Illinois State, 1964, M.S., 1966.

RICHARD ALLEN GEORGE (1969)
Instructor in Speech Communication.
B.S., Illinois State, 1965, M.S., 1967.

TOMMY ALLEN GEORGE (1966)
Assistant Professor of Agricultural Engineering (Courtesy); Agricultural Engineer, Soil Conservation Service, USDA.
B.S., Nebraska, 1960.

WALLACE EUGENE GIBBS (1958)
Registrar and Director of Admissions (Professor).
B.S., Oregon State, 1950, Ed.M., 1959.

FREDERICK LEONARD GIBSON (1964)
Assistant to Medical Director Student Health Service; Assistant Professor of Physical Education and Hygiene.
B.B.A., Golden Gate College, 1957; M.S.H.A., Northwestern, 1959.

JOHN SEARLE GIFFIN (1964)
Student Health Service (Professor); Team Physician, Athletic Department.
B.S., Wisconsin, 1934; M.D., Chicago, 1936.

DONALD EDWARD GILES (1968)
Extension Marine Science Education Specialist (Instructor).
A.A., Grant Tech College, 1951; B.A., University of the Pacific, 1953, M.A., 1956.

FRANCOIS ARCHIBALD GILFILLAN (1918, 1922-25, 1927)
Dean Emeritus of the School of Science; Professor Emeritus of Chemistry.
B.S., Oregon State, 1918, Ph.G., 1918, Ph.C., 1920; Ph.D., Yale, 1921.

GORDON WAVERLY GILKEY (1947)
Dean, College of Liberal Arts; Professor of Art.
B.S., Albany College, 1933; M.F.A., Oregon, 1936; Arts D., Lewis and Clark, (honorary), 1957.

BERNARD HOWARD GILMORE, JR. (1966)
Associate Professor of Music, Conductor University Orchestras.
B.A., UCLA, 1959, M.A., 1961; D.M.A., Stanford, 1966. On sabbatical 1972-73.

JAMES WARREN GILLETT (1964)
Research Associate in Agricultural Chemistry (Associate Professor).
B.S., Kansas, 1955; Ph.D., California, (Berkeley), 1962.

GALE ALLEN GINGRICH (1973)
County Extension Agent (Instructor).
B.S., Oregon State, 1972.

WILLIAM RAY GLASS, AIA, S. A. H., A. I. D. (1956)
Professor of Architecture.
B.Arch., Oregon, 1956. Architect, 1963.
On leave 1974.

WILLIAM FISCHER GLASSMIRE, JR. (1969)
Assistant Professor of Mathematics.
S.B., MIT, 1965; Ph.D., Stanford, 1970.

GEORGE WALTER GLEESON (1928)
Dean Emeritus, School of Engineering; Professor Emeritus of Chemical Engineering.
B.S., Oregon State, 1928, M.S., 1934, Ch.E., 1936.

GERALD JAY GLEICHER (1966)
Associate Professor of Chemistry.
B.S., Brooklyn College, 1959; M.S. Chem., Michigan, 1961, Ph.D., 1963.

RUSSELL HOLCOMB GODARD (1950)
Assistant Professor of Mathematics.
B.S., Oregon State, 1938; M.A., Iowa, 1939.

EARL GODDARD (1967)
Dean, School of Business & Technology; Professor of Business Administration.
B.S., Southern Illinois University, 1944; M.B.A., Northwestern, 1946; Ph.D., Washington, 1956.

ROBERT KENNETH GODWIN (1971)
Assistant Professor of Political Science.
B.A., Wake Forest, 1966; M.A., New Mexico, 1968; Ph.D., North Carolina, 1971.

NORMAN RICHARD GOETZE (1959)
Extension Agronomist, Cooperative Extension Service, (Professor).
B.S., Oregon State, 1952, M.S., 1955; Ph.D., Purdue, 1960.

HARRY EARL GOHEEN (1955)
Professor of Mathematics and Computer Science.
B.A., Stanford, 1936, M.A., 1938, Ph.D., 1940.

FRED BRYANT GOMM (1971)
Research Agronomist, Squaw Butte Experiment Station (Courtesy Assistant Professor).
B.S., Utah State, 1950, M.S., 1956.

JEFFERSON JOHN GONOR (1964)
Assistant Professor of Oceanography and Zoology, Marine Science Center.
B.S., Southwestern Louisiana, 1953; Ph.D., Washington, 1964.

DELMER MORRISON GOODE (1919)
Curriculum Consultant; Professor (Higher Education); Editor of Publications.
B.A., Minnesota, 1916; M.A., Oregon State, 1938.

SALLY FRANCES GOODMAN (1970)
Washington County Extension Agent (Instructor).
B.S., Oregon State, 1970.

DENNIS T. GORDON (1973)
Research Associate, Food Science and Technology (Seafoods Lab).
B.S., Illinois, 1963; M.S., Connecticut, 1969, Ph.D., 1973.

KENNETH LLEWELLYN GORDON (1927)
Professor Emeritus of Zoology.
A.B., Colorado College, 1923; M.A., Missouri, 1925; Ph.D., Cornell, 1936.

LOUIS I. GORDON (1969)
Assistant Professor of Oceanography.
B.S., UCLA, 1951; M.S., U.C. Scripps, 1953, Ph.D., Oregon State, 1973.

DAVID F. GOSSER (1970)
Extension Oceanographic Technician (Instructor).
A.B.S., Clatsop Comm. Coll., 1970.

ROBERT LEE GOULDING (1955)
Professor of Entomology.
B.S., Florida, 1946, M.S., 1948; Ph.D., Ohio State, 1955.

DON FREDERICK GRABE (1968)
Professor of Agronomy, Agronomic Crop Science.
B.S., Iowa State, 1950, M.S., 1955, Ph.D., 1957.

AGNES MARTIN GRADY (1970)
Catalog Librarian (Instructor).
B.A., Washington, 1969, M.L.S., 1970.

CRAWFORD HENDERSON GRAHAM (1961)
Associate Professor, Director of Alumni Relations.
B.S.Engr., Oregon State, 1936.

JOSEPH ALFRED GRAHAM (1970)
Chief Instructor in Military Science, Sgt. Major, U. S. Army.

ROBERT DOUGLAS GRAHAM (1961)
Associate Professor of Forest Products.
B.S., Pennsylvania State, 1941; M.S., Oregon State, 1947.

PHYLLIS EMOGENE GRANT (1949)
Assistant Professor of Clothing, Textiles, and Related Arts.
B.S., Minnesota, 1939; M.S., Oregon State, 1950.

ARTHUR EUGENE GRAVATT (1962-64, 1973)
Professor of Family Life.
B.A., Linfield, 1949; M.A., Oregon, 1951; Ph.D., Oregon State, 1963.

CLIFFORD FREDERICK GRAY (1961-2, 1965)
Associate Professor of Business Administration.
B.S., Millikin, 1959; M.B.A., Indiana, 1961; D.B.A., Oregon, 1966.

IRIS GRAY (1933-42, 1944)
Professor Emeritus of Music.
B.M., Cincinnati Conservatory of Music, 1933; M. M., Idaho, 1944.

JAMES LATIMER GRAY (1949)
Associate Professor of Industrial and General Engineering.
B.S., Oregon State, 1948.

RANDALL LEE GREEN (1973)
Area Head Resident, Housing (Instructor).
B.A., Miami, 1970, M.S., 1973.

MARY ANNE GREENLUND (1972)
Coos County Extension Agent, 4-H and Youth Development (Instructor).
B.S., Oregon State, 1955.

RICHARD CARL GREENWOOD (1969)
Director of Budgets and Personnel Services (Assistant Professor).
B.S., Oregon State, 1959.

MARIE HULL GREGORY (1926-35, 1942)
Catalog Librarian (Associate Professor Emeritus).
B.A., Oregon, 1925; B.S. (Lib. Sc.), Washington, 1926.

CHARLES CROCKER GRIER (1972)
Research Associate in Forest Management.
B.S., Washington, 1968, Ph.D., 1972.

MARY JANE GRIEVE (1970)
Assistant Professor of Home Economics Education.
B.S., North Dakota State, 1943; M.S., Oregon State, 1960.

BETTY GRIFFIN (1973)
Instructor in Education.
B.S., Fisk Univ., 1965.

DAVID J. GRIFFITHS (1967)
Associate Professor of Physics.
B.A., University of British Columbia, 1959, M.S., 1960, Ph.D., 1965.

ROBERT PORTER GRIFFITHS (1971)
Instructor in Microbiology.
A.B., Oberlin, 1961; M.A., San Jose State, 1969; Ph.D., Oregon State, 1972.

JOHN KEITH GRIMES (1942-44, 1953)
Clatsop County Extension Agent, 4-H & Youth (Assistant Professor).
B.S., Oregon State, 1940.

ROLAND HERBERT GRODER (1950)
Extension Fruit and Vegetable Marketing Specialist (Professor).
B.S., Maine, 1950; M.S., Cornell, 1960.

JAMES WILLARD GROSHONG (1946, 1950)
Professor of English.
A.B., Stanford, 1947, Ph.D., 1957.

ALVIN EUGENE GROSS (1935)
Professor Emeritus of Agronomy, Klamath Experiment Station.
B.S., Oregon State, 1932, M.S., 1935.

LOUIS HENRY GROSS (1943)
Yamhill County Extension Chairman (Professor Emeritus).
B.S., Oregon State, 1939; M.Agr.Ed., Arizona, 1963.

GARY LEE GRUNKEMEIER (1972)
Research Associate in Statistics.
B.S., St. Martin's College, 1967; M.A., Catholic Univ. (Washington, D. C.), 1970, Ph.D., 1972.

CHARLES M. GUDGER (1970)
Assistant Professor of Business Administration,
B.S., Kansas, 1947, M.S., 1968, Ph.D., 1970.

RONALD BERNARD GUENTHER (1966)
Associate Professor of Mathematics.
B.A., Oregon State, 1959, M.A., 1962; Ph.D., University of Colorado, 1964. On sabbatical 1973-74.

LINDA LEE GUGGENHEIM (1969)
Instructor in Physical Education.
B.S., Wisconsin, 1964; M.S., Arizona, 1969.

WALTER BROOKS GULICK (1971)
Instructor in Philosophy.
B.A., Pomona, 1960; M.A., Columbia, 1966.

PAUL JAMES GUNN (1948)
Professor of Art; Director, Oregon Study Center in Tokyo, 1972-74.
B.S., Pennsylvania State Teachers (Edinboro), 1947; M.F.A., California College of Arts and Crafts, 1948.

JOHN REGINALD GURTON (1948)
Lincoln County Extension Agent, Chairman (Associate Professor).
B.S., Minnesota, 1939.

MARGARET BASILIA GUSS (1969)
Social Sciences and Humanities Librarian (Assistant Professor).
A.B., Oberlin, 1966; M.L.S., Oregon, 1969.

OSCAR ADAM GUTBROD (1965)
Extension Certification Assistant (Assistant Professor).
B.S., Oregon State, 1964.

JUAN GUZMAN (1973)
Instructor in Vocational Education.
B.Ed., Alaska, 1967, B.A., 1967; M.A., Oregon, 1968.

JOSEPH ROY HAAG (1927)
Professor Emeritus of Chemistry and Animal Nutrition, Agricultural Chemistry.
B.S., Penn State, 1918, M.S., 1923; Ph.D., Minnesota, 1926.

FRED HAGELSTEIN (1951-53, 1958)
Extension Area Supervisor—Pendleton (Professor).
B.S., Oregon State, 1951; M.S., Wisconsin, 1967.

IVAN JOHN HAGEN (1969)
Extension Certification Specialist, Agronomic Crop Science (Instructor).
B.S., Oregon State, 1969.

JAMES W. HAGLUND (1973)
Instructor in Agricultural Engineering (Courtesy), Soil Conservation Service, USDA.
B.S., Portland State, 1968.

OSCAR NATHANIEL HAGG (1950)
Extension Dairy Products Marketing Specialist (Associate Professor Emeritus).
B.S., Oregon State, 1926.

MARVIN REYNOLDS HAITH (1943-44, 1946)
Associate Professor Emeritus of General Engineering.
B.S., Nebraska, 1928.

RAYMOND FLOYD HALE (1972)
Instructor in Aerospace Studies; Staff Sergeant, USAF.

LUCIA HALEY (1921)
Assistant Librarian (Associate Professor Emeritus).
A.B., Washington, 1911; Graduate, Pratt Institute, 1912, B.L.S., 1942.

FRANCES ANN HALL (1930-58, 1961)
Klamath County Extension Agent (Associate Professor Emeritus Home Economics).
B.S., University of Puget Sound, 1925; M.S., Oregon State, 1930.

JACK VERNON HALL (1954)
Professor of Elementary Education.
B.A., Central Washington, 1944; M.A., Colorado State College, 1947, Ed.D., 1951.

JAMES DANE HALL (1963)
Associate Professor of Fisheries.
A.B., California, 1955; M.S., Michigan, 1960; Ph.D., 1963.

MARY JO HALL (1969)
Associate Professor, Division of Continuing Education.
B.S., Oregon, 1961, M.S., 1968.

PAIGE LeROY HALL (1954)
Lane County Extension Agent (Associate Professor Emeritus).
B.S., Nebraska, 1930.

WILLIAM THOMAS HALL (1969)
Assistant Professor of History.
B.A., Oklahoma State, 1959; M.A., Oregon, 1962, Ph.D., Oregon, 1973.

ALBERT NELSON HALTER (1960)
Professor of Agricultural Economics.
B.S., Iowa State, 1952; M.S., 1953; Ph.D., Michigan State, 1956.

MARGARET ELIZABETH HAMILTON (1957)
Multnomah County Extension Agent, Home Economics (Associate Professor).
B.S., Oregon State, 1944; M.S., Columbia, 1966.

ROBERT ROY HAMILTON (1968)
Grant County Extension Agent (Assistant Professor).
B.S., Washington State, 1966, M.S., 1971.

TIMOTHY MERRILL HAMMONDS (1970)
Assistant Professor of Agricultural Economics.
B.S., Cornell, 1966, M.B.A., 1967, Ph.D., 1970.

RICHARD O. HAMPTON (1965)
Associate Professor of Plant Pathology (Courtesy), Research Plant Pathologist, ARS, USDA.
B.S.A., Arkansas, 1951; M.S., Iowa State, 1954, Ph.D., 1957.

ASTRID FROLICH HANCOCK (1963)
Assistant Professor of Physical Education.
A.B., Mount Holyoke, 1956; M.Sc., Wisconsin, 1959.

DANIL R. HANCOCK (1963)
Instructor in Oceanography.
B.A., UCSB, 1963; M.S., Oregon State, 1969.

ELMER HANSEN (1935)
Professor Emeritus of Horticulture.
B.S., Oregon State, 1934, M.S., 1935; Ph.D., Chicago, 1946.

EVERETT MATHEW HANSEN (1972)
Research Associate in Botany and Plant Pathology.
B.S., Oregon State, 1968; M.S., Wisconsin, 1971, Ph.D., 1972.

HENRY PAUL HANSEN (1939)
Dean Emeritus of Graduate School; Professor Emeritus of Palynology.
Ph.B., Wisconsin, 1930, Ph.M., 1931; Ph.D., Washington, 1937.

NIELS JOHN HANSEN (1943)
Area Extension Agent, Water Resource Development (Professor Emeritus).
B.S., Oregon State, 1941.

ROLAND STUART HANSON (1972)
Instructor in Industrial and General Engineering.
B.S., Fairleigh Dickinson, 1957, M.B.A., 1960.

RIZWANUL HAQUE (1966)
Research Associate in Agricultural Chemistry (Assistant Professor).
B.S., Agra, 1957; M.S., Aligarh, 1959; Ph.D., University of British Columbia, 1966.

DAVID POWELL HARDESTY (1968)
Assistant Professor of Art.
B.F.A., Miami University, 1966; M.F.A., Cranbrook Academy of Art, 1968.

EDWARD EUGENE HARDIN (1957)
Associate Professor of Seed Technology.
B.S., Washington State, 1951.

G. THOMAS HARDING (1969)
Physician and Surgeon, Student Health Service.
M.D., Washington.

JOHN ROBERT HARDISON (1944)
Professor of Plant Pathology (Courtesy); Research Plant Pathologist, USDA.
B.S., Washington State, 1939; M.S., Michigan, 1940, Ph.D., 1942.

VIRGINIA FRANCES HARGER (1967)
Professor and Head of Institution Management.
B.S., Washington State, 1934; M.S., Kansas State, 1938.

STEPHEN RAY HARKINS (1973)
Instructor in Aerospace Studies, Tech. Sgt, USAF.

JESSE EDWARD HARMOND (1945)
Professor Emeritus of Agricultural Engineering.
B.S., Mississippi State, 1932.

JAMES ARTHUR HARPER (1942)
Professor of Poultry Science.
B.S., Oregon State, 1940; M.S., Penn State, 1942.

ROBERT DENNIS HARR (1971)
Assistant Professor of Forest Hydrology.
B.S., Washington State, 1963; Ph.D., Colorado State University, 1967.

BILLY L. HARRIS (1973)
Extension Soil Specialist (Assistant Professor).
B.S., Texas Tech, 1968, M.S., 1969; Ph.D., Oregon State, 1973.

CHARLES NEWTON HARRIS (1946)
Professor Emeritus of Speech Communication.
B.S., Idaho, 1940; M.A., Colorado State College, 1945, Ed.D., 1960.

FREDERICK PHILIP HARRIS (1967)
Professor and Chairman of Philosophy.
A.B., Willamette, 1935; M.A., Columbia, 1937, Ph.D., 1944.

IRWIN CECIL HARRIS (1945)
Director of Student Publications and Public Events; Professor of Journalism.
B.S., Oregon State, 1941; M.S.J., Northwestern, 1943.

JOAN LEE HARRIS (1971)
Counselor, Counseling Center and University Exploratory Studies Program (Instructor).
B.S., Oregon State, 1949, M.Ed., 1970.

LONNIE BENJAMIN HARRIS (1969)
Director of Office of Educational Opportunities, (Instructor).

RALPH DANIEL HART (1969)
Union County Extension Agent (Assistant Professor).
B.S., Idaho, 1951, M.A., 1965.

CHARLOTTE T. HARTER (1960)
Assistant Professor of Economic Education, Assistant Professor of Economics (Courtesy), Director of Center for Economic Education.
B.A., Wellesley College, 1948; M.A., Stanford, 1958.

LAFAYETTE GEORGE HARTER, JR. (1960)
Professor of Economics.
B.A., Antioch College, 1941; M.A., Stanford, 1948, Ph.D., 1960.

ROBERT ALLEN HARTMAN (1970)
Program Coordinator (Instructor), Student Housing and Residence Programs.
B.S., Ball State, 1966, M.A., 1967.

NORBERT ALFRED HARTMANN, JR. (1969)
Assistant Professor of Statistics.
A. A., Wharton County Junior College, 1962; B.A., Texas A&M, 1964, M.S., 1967, Ph.D., 1970.

FRANCES MADELEINE HARVEY (1946)
Josephine County Extension Agent, Home Economics (Associate Professor).
B.S., Idaho, 1943; M.S., Oklahoma State, 1957.

MOYLE E. HARWARD (1955)
Professor of Soil Science.
B.S., Brigham Young, 1948; M.S., Massachusetts, 1950; Ph.D., North Carolina State, 1952.

SHIRLEY S. HASELTON (1968)
Assistant Professor of Education.
B.A., St. Mary of the Woods, 1948; M.Ed., Oregon State, 1963.

DUANE LEROY HATCH (1959)
Lane County Extension Agent (Associate Professor).
B.S., Utah State, 1950; M.S., Oregon State, 1973.

RONALD LEE HATHAWAY (1972)
Klamath County Extension Agent, Livestock (Instructor).
B.S., California Polytechnic, 1968; M.S., Nevada, 1972.

JAMES FRANZ HAUN (1964)
Director of New Student Programs (Associate Professor).
B.S., Eastern Oregon College, 1954; M.Ed., Oregon, 1960; D.Ed., Oregon State, 1967.

ALFRED HAUNOLD (1965)
Associate Professor of Agronomy (Courtesy); Research Geneticist, Crops Research Division, ARS, USDA.
Diplom Ingenieur, Agriculture University, Vienna, 1951, Dr. Agric., 1952; Ph.D., Nebraska, 1960.

ERNEST MILLARD HAUSER (1930)
Malheur County Extension Agent, 4-H Club (Associate Professor Emeritus).
B.S., Oregon State, 1928.

STEPHEN JAMES HAWKES (1968)
Associate Professor of Chemistry.
B.Sc., London, 1953; Ph.D., London, 1963.

BETTY EILEEN HAWTHORNE (1946)
Dean, School of Home Economics; Professor of Foods and Nutrition.
B.S., Washington, 1941, M.S., 1944; Ph.D., Michigan State, 1954.

JAMES RONALD HAY (1966)
Marion County Extension Agent (Assistant Professor).
B.S., Oregon State, 1964, M.S., 1966.

EDWARD HENRY HEATH (1967)
Professor and Head of Resource Recreation Management.
B.A., College of Idaho, 1955; M.Ed., Idaho, 1956; Ph.D., Illinois, 1965.

GEORGE ROSS HEATH (1968)
Associate Professor of Oceanography.
B.Sc., University of Adelaide, 1960, B.Sc. (Hons), 1961; Ph.D., California (San Diego), 1968.

KATHLEEN FRANCES HEATH (1967)
Assistant Professor of Physical Education.
B.A., Marylhurst College, 1953; M.S., Illinois, 1963.

KENNETH WAYNE HEDBERG (1956)
Professor of Chemistry.
B.S., Oregon State, 1943; Ph.D., Cal Tech. 1948.

LISE HEDBERG (1956)
Research Associate in Chemistry.
Cand. Real., University of Oslo, 1952.

DENNIS INGEMUND HEDGES (1966)
Assistant Athletic Director, (Assistant Professor).
B.S., Oregon State, 1961.

JOEL WALKER HEDGPETH (1965)
Professor of Oceanography, Marine Science Center.
B.A., California (Berkeley), 1933, M.A., 1939, Ph.D., 1952.

JAMES LEE HEDTKE (1973)
Research Associate in Fisheries and Wildlife.
B.S., Wisconsin State, 1967; Ph.D., Minnesota, 1973.

PAUL ARTHUR HEIKKILA (1969)
Marine Extension Agent (Instructor).
B.S., Washington, 1968.

THOMAS L. HEINECKE (1973)
Instructor in Civil Engineering.
B.S.C.E., Washington State, 1967; M.S.C.E., Purdue, 1968.

DONALD FREDERICK HEINRICHS (1966)
Assistant Professor of Oceanography.
B.S., Stanford, 1960, Ph.D., 1966.
On leave through Sept. 1974.

OLIVER HARRY HEINTZELMAN (1949)
Professor of Geography.
B.A., Central Washington, 1940; M.A., Washington, 1948, Ph.D., 1952.

DONALD HAROLD HELFER (1963)
Associate Professor of Veterinary Medicine.
B.S., Washington State, 1948; D.V.M., 1949; M.S., Oregon State, 1966.

ROBERT WESLEY HENDERSON (1938-41, 1946)
Assistant Director (Professor), Agricultural Experiment Station.
B.S., Oregon State, 1938; Ph.D., Minnesota, 1950.

HOMER MATHEWSON HEPWORTH (1967)
Research Associate in Agronomic Crop Science.
B.S., Wyoming, 1958, M.S., 1958; Ph.D., Colorado State, 1968.

ELZIE VANCE HERBERT (1920)
Order Librarian Emeritus (Assistant Professor).

JOHN RAYMOND HERBST (1972)
Area Manpower Extension Agent (Instructor).
B.S., Michigan Tech, 1963; M.F., Idaho, 1968.

FRANCIS ROBERT HERMAN (1963)
Mensurationist and Research Forester, Forestry Sciences Laboratory, U. S. Forest Service, Assistant Professor of Forestry (Courtesy).
B.S.F., Colorado State University, 1946, M.F., 1947.

FREYA FRIEDERIKE HERMANN (1962)
Assistant Professor of Pharmaceutical Science.
B.S., University of Munich, 1949; B.S., Oregon State, 1959; M.S., Ohio State, 1969.

RICHARD KARL HERMANN (1961)
Professor of Forest Ecology.
B.S., Ludwig-Maximilian University, Munich, 1951; M.F., Yale, 1956; Ph.D., Oregon State, 1960.

JACOB ABRAHAM HERRMANN (1959)
Assistant Professor Emeritus of Mathematics.
C.E., Cornell, 1930.

JAMES HERMAN HERZOG (1967)
Associate Professor of Electrical and Computer Engineering.
B.S., Northwestern, 1962; M.S., Michigan, 1963, Ph.D., 1967.

JOHN CLARENCE HESKETH (1951)
Umatilla County Extension Chairman (Professor).
B.S., Oregon State, 1951; M.S., Wisconsin, 1960.

MARGARET W. HEWITT (1961)
Assistant Professor, Division of Continuing Education.
B.A., Oregon, 1944; M.L.S., California (Berkeley), 1945.

RAY STORLA HEWITT (1953)
Professor of English.
A.B., Oregon, 1941, M.A., 1947; Ph.D., California, 1951.

EDGAR WENDELL HEWSON (1968)
Professor and Chairman of Atmospheric Sciences.
B.A., Mt. Allison, 1932; M.A., Dalhousie, 1933; M.A., Toronto, 1935; Ph.D., London, 1937.

ROGER A. HEYDEN (1972)
Instructor in Health (Courtesy)
B.S., Oregon State, 1964, Ed.M., 1966.

HUGH JAMES HICKERSON (1959)
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B.S., Oregon State, 1952.

MISAKO HIGA (1972)
Assistant Professor of Clothing, Textiles and Related Arts.
B.A., Berea College, 1955; M.S., Tennessee, 1959; Ph.D., Minnesota, 1973.

RICHARD MORGAN HIGHSMITH, JR. (1947)
Professor and Chairman of Geography.
B.A., Central Washington, 1941; M.A., Washington, 1946, Ph.D., 1950.

IDA CATHERINE HILBERS (1940)
Assistant Catalog Librarian (Assistant Professor).
B.A., Arizona, 1922, Certificate of Librarianship, 1928; M.A. (Lib. Sc.), California, 1931. Retired.

EMERY VERNON HILDEBRANDT (1953)
Associate Professor of Speech Communication.
B.S., Oregon State, 1950; M.A., Penn State, 1956; Ph.D., Oregon, 1970.

HELEN JEAN HILDEBRANDT (1966)
Instructor in Speech Communication.
B.A., Univ. of Akron, 1950; M.A., Pennsylvania State, 1952.

KENNETH STEPHEN HILDERBRAND, JR. (1969)
Head, Marine Advisory Program (Associate Professor).
B.S., Oregon State, 1962, M.S., 1964.

DONALD DAVID HILL (1927)
Professor Emeritus of Agronomy.
B.S., Oregon State, 1925; M.S., Kansas State, 1927; Ph.D., Cornell, 1936.

HOWARD HERBERT HILLEMANN (1946)
Professor of Zoology.
B.S., Marquette, 1933; M.A., Wisconsin, 1939, Ph.D., 1942.

EUGENE HILLIARD (1969)
Assistant Football Coach (Assistant Professor).
B.S., Oregon State, 1964, M.Ed., 1965.

IVY ELIZABETH HILTY (1959)
Jefferson County Extension Agent, Home Economics (Assistant Professor Emeritus).
B.S., Oklahoma Panhandle Agricultural Mechanical College, 1937.

THOMAS RICHARD HINDS (1973)
Research Associate in Biochemistry and Biophysics.
B.A., Western Washington State, 1966; Ph.D., Oregon State, 1972.

ROBERT C. HINZ (1950)
General Manager of Stations KOAC AM-TV, KOAP FM-TV (Associate Professor), Oregon Educational and Public Broadcasting Service.
B.A., Oregon, 1950.

FREDERICK LEE HISAW, JR. (1958)
Associate Professor of Zoology.
B.S., (Agr.), Missouri, 1950, M.S., 1952; Ph.D., Harvard, 1955.

JOSEPH F. HLEBICHUK (1971)
Distributive Education Teacher-Educator, Assistant Professor of Business Education.
B.S., Dickinson State, 1961; M.S., Montana State, 1968, Ed.D., 1971.

PHILIP WEN-JEN HO (1953)
Catalog Librarian (Assistant Professor).
B.A., Yenching University (China), 1939, M.A., 1941; M.L., Washington, 1953.

DATA MAXINE HOCHHALTER (1959)
Jackson County Extension Agent, Home Economics (Associate Professor).
B.S., North Dakota Agricultural College, 1940; M.A., Washington State, 1954.

BERT LLOYD HOCKETT (1970)
Lane County Extension Agent (Assistant Professor).
B.S., Oregon State, 1964.

FREDERICK DALE HOECKER (1946-58, 1963)
Warm Springs Extension Agent (Assistant Professor).
B.S., Oregon State, 1946.

WYMAN DELOS HOEYE (1959)
Associate Professor of Industrial Education.
B.S., Oregon State, 1951, M.S., 1958.

ELBERT NEIL HOFFMAN (1942)
Associate Professor of Agronomy, Superintendent, Malheur Experiment Station.
B.S., Oregon State, 1939.

NORBERT EDWARD HOFFMAN (1973)
Assistant Professor of Pharmacology.
B.S., California Polytechnic at Pomona, 1963, M.S., 1970; Ph.D., Oregon State, 1973.

JEAN DAVIES HOGENSEN (1970)
Assistant Director, Financial Aid (Assistant Professor).
B.S., Oregon State, 1942, M.S., 1970.

THOMAS CLARK HOGG (1965)
Associate Professor and Chairman of Anthropology.
B.S., Oregon, 1958, M.A., 1963, Ph.D., 1965.

WILLIAM HOGSETT III (1973)
Research Associate in Botany.
B.S., Texas Christian, 1966; Ph.D., Baylor College of Medicine, 1973.

TERESA ANN HOGUE (1974)
Extension Agent (Instructor).
B.S., Oregon State, 1972.

WILLIAM D. HOHENBOKEN (1970)
Assistant Professor of Animal Breeding and Genetics.
B.S., Oklahoma State, 1963; M.S., Colorado State, 1968, Ph.D., 1969.

GLENN WILLIS HOLCOMB (1920)
Professor Emeritus of Civil Engineering.
B.S., Michigan, 1919; M.S., Oregon State, 1931.

ARNOLD GRAY HOLDEN (1970)
Assistant Professor of Sociology.
B.A., Union College, 1964; M.A., Michigan State, 1967, Ph.D., 1972.

HAROLD FULLER HOLLANDS (1948)
Professor Emeritus of Agricultural Economics.
B.S., Minnesota, 1923, Ph.D., 1939.

JAMES FREDERICK HOLMES (1968)
Assistant Professor of Electrical and Computer Engineering (Courtesy).
B.S., Washington, 1959; M.S., Maryland, 1963; Ph.D., Washington, 1968.

OLIVER WENDELL HOLMES JR. (1960-64 and since 1970)
Associate Professor of Agricultural Economics (Courtesy), USDA.
B.S., California, 1958; M.S., Montana State, 1960.

MARY MARGARET HOLTHOUSE (1965)
Assistant Professor, Department of Information; Extension Communication Specialist.
B.S., Oregon State, 1937, M.H.Ec., 1967.

ROBERT LAWRENCE HOLTON (1971)
Research Associate in Oceanography.
B.A., Montana, 1950, M.E., 1958; M.S., Oregon State, 1962; M.S., Minnesota, 1965; Ph.D., Oregon State, 1968.

EDWARD FRANK HOOVEN (1961)
Associate Professor of Forest Wildlife Ecology.
B.S., Washington, 1948; M.S., Oregon State, 1958, Ph.D., 1972.

WALTER S. HOPKINS (1971)
Associate Professor of Forest Management.
B.S., Colorado State University, 1937.

CHESTER ELLSWORTH HORNER (1951)
Professor of Plant Pathology (Courtesy); Pathologist, USDA.
B.A., Walla Walla, 1950; Ph.D., Oregon State, 1954.

KARL HORNYIK (1970)
Assistant Professor of Nuclear Engineering.
Dipl. Ing., Vienna, 1960; M.S., Illinois, 1961, Ph.D., 1965.

ELVERA CHARLOTTE HORRELL (1942)
Extension Agricultural Economist (Assistant Professor Emeritus).

HOWARD FRANKLIN HORTON (1958)
Professor of Fisheries.
B.S., California Polytechnic, 1953; M.S., Oregon State, 1955, Ph.D., 1963.

GEZA HORVATH (1968)
Assistant Professor of History.
B.A., Marian College, 1963; M.A., Indiana, 1966, Ph.D., 1970.

HELEN SCRUGGS HORVATH (1965)
Head, Catalog Department (Associate Professor), Library.
B.A., Washington University, 1955; M.A., Illinois, 1957, M.S., 1963.

YASUHARU TIMOTHY HOSOI (1969)
Assistant Professor of Religious Studies.
B.Th., Tokyo Bible Seminary, 1954; B.D., Christian Theological Seminary, Indianapolis, 1964; M.A., Butler University; M.A., Chicago, 1968, Ph.D., 1974.

ROBERT JOHN HOUSTON (1966)
Assistant Professor of Health.
B.Ed., Oregon, 1950; M.Ed., University of Portland, 1958; M.P.H., California (Berkeley), 1964; Ed.D., Oregon, 1964.

CLARENCE WARREN HOVLAND (1949)
Professor and Chairman of Religious Studies.
B.A., Lawrence College, 1940; B.D., Yale, 1943, Ph.D., 1950.

ROBERT LEE HOWARD (1958)
Research Associate in Biochemistry and Biophysics.
B.S., Oregon State, 1958.

SHIRLEY JEAN HOWARD (1959)
Producer, KOAC-AM (Associate Professor), Oregon Educational and Public Broadcasting Service.
B.S., Oregon State, 1951; M.A., Michigan State, 1964.

HERBERT BADOLLET HOWELL (1921)
John Jacob Astor Experiment Station, Professor Emeritus.
B.S., Oregon State, 1916.

MICHAEL EDWARD HOWELL (1973)
Morrow County Extension Agent (Instructor).
B.S., Idaho, 1972, M.S., 1973.

HAROLD PRESTON HOYT (1961)
Assistant Director for Community Relations (Professor), Division of Continuing Education.
B.A., Willamette, 1936; M.Ed., Oregon, 1960; Ed.D., Wyoming, 1969.

KITTY AI-PING HSIEH (1972)
Engineering Librarian (Assistant Professor).
M.S., Maryland, 1969; M.L.S., University of Pittsburgh, 1972.

JAMES RUSSELL HUBER (1947)
Union County Extension Agent, 4-H and Youth (Associate Professor).
B.S., Utah State, 1946, M.S., 1947.

MILON GEORGE HUBER (1945)
Extension Agricultural Engineering Specialist (Associate Professor Emeritus).
B.S., (Agric.), Wisconsin, 1929, B.S., M.E., 1932.

ARTHUR DOUGLAS HUGHES (1938)
Professor of Mechanical Engineering.
B.S., Washington State, 1932, M.S., 1932. M.E., 1953.

KENNETH M. HUGHES (1964)
Assistant Professor of Entomology (Courtesy), Forestry Sciences Laboratory.
B.A., Willamette University, 1941.

CELIA GRACE HULETT (1973)
Washington County Extension Agent (Instructor).
A.B., California at Davis, 1967.

LARRY CLIFTON HUNTER (1968)
Professor of Computer Science, Director of Computer Center.
B.A., Montana, 1952, M.A., 1953; Ph.D., Oregon, 1957.

FLORENCE LOUISE HUPPRICH (1937)
Associate Professor Emeritus of Physical Education.
B.S., Wisconsin, 1923, M.A., 1926; Ed.D., Oregon, 1949.

MILES JAY HUTCHINS (1973)
Instructor in Business Administration.
B.S., Oregon, 1960.

BURTON SEYMOUR HUTTON (1935-43, 1948)
State Leader 4-H & Youth (Professor Emeritus).
B.S., Oregon State, 1926.

ADRIANA HUYER (1973)
Research Associate (Courtesy) in Oceanography.
B.Sc., Toronto, 1967; M.S., Oregon State, 1971, Ph.D., 1974.

JAMES DAVIS INGLE, JR. (1972)
Assistant Professor of Chemistry.
B.S., Illinois, 1968; Ph.D., Michigan State, 1971.

SARA ERB INGLE (1972)
Research Associate in Oceanography.
B.S., Denison, 1968; Ph.D., Michigan State, 1972.

PATRICIA C. INGRAM (1971)
Assistant Professor of Physical Education.
B.A., Western Washington, 1954; M.S., Oregon, 1965.

MICHAEL SHIGERU INOUE (1964)
Associate Professor of Industrial and General Engineering.
B.E.E., University of Dayton, 1959, M.S., 1964; Ph.D., Oregon State, 1967.

JOHN JERRY INSKEEP (1956-61)
County Extension Agent (Professor Emeritus) Clackamas County.
B.S. (Agr.), Purdue, 1921; M.S., Oregon State, 1943.

HELGE IRGENS-MOLLER (1957)
Associate Professor of Forest Genetics.
B.S., Royal Veterinary and Agricultural College, Denmark, 1949; Ph.D., Oregon State, 1958.

RICHARD FREDRICK IRVIN (1967)
Assistant Professor of Physical Education.
B.S., Slippery Rock State College, 1954; M.S., Illinois State, 1959.

THOMAS ROBERT IRWIN (1968)
Instructor in Physical Education.
Soloist with Ballet Russe de Monte Carlo; advanced studies in ballet in Monte Carlo, Paris, New York, Chicago, San Francisco, and Portland.

IRVIN ISENBERG (1965)
Professor of Biophysics.
A.B., Temple, 1944; Ph.D., Pennsylvania, 1950.

ARLEIGH GENTRY ISLEY (1969)
Lake County Extension Chairman (Assistant Professor).
B.S., Oregon State, 1969.

CLINTON C. JACKS (1972)
Central Oregon (Deschutes) Extension Agent (Instructor).
B.A., Sacramento State, 1965; B.S., Oregon State, 1970; M.S., 1972.

CHARLES BARRY JACKSON (1973)
Extension Communication Specialist (Instructor).
A.A., San Diego City College, 1963.

MILTON JACKSON (1972)
Minority Recruiter (Instructor), Intercollegiate Athletics.
B.A., Sacramento State, 1970; M.Ed., Oregon State, 1973.

ROYAL GALE JACKSON (1970)
Assistant Professor of Resource Recreation Management.
B.A., New Mexico, 1960; M.A., Western New Mexico, 1965; Ph.D., New Mexico, 1971.

STONEWALL ANDREW JACKSON (1939)
Benton County Extension Chairman (Professor Emeritus).
B.S., Oregon State, 1937.

THOMAS LLOYD JACKSON (1952)
Professor of Soil Science.
B.S., Washington State, 1943, M.S., 1948, Ph.D., 1952.

ROBERT WARREN JACOBSON (1967)
Marine Extension Agent (Assistant Professor).
B.A., Oregon State, 1963.

ALEX JULIUS JAENICKE (1956)
Associate Professor Emeritus of Forest Management.
B.S., Pennsylvania State, 1912.

KIZHANATHAM ATHINATHAN JAGANNATHAN (1971)
Visiting Assistant Professor of Political Science.
B.A., University of Calcutta, 1957, LL.B., 1961; M.A., Kansas, 1965; Ph.D., Washington, 1971.

DEMETRIOS GEORGE JAMESON (1950)
Professor of Art.
B.F.A., Washington University, 1949; M.F.A., Illinois, 1950.

KATHLEEN CARNES JAMIESON (1970)
Gilliam-Wheeler County Extension Agent (Instructor).
B.A., College of St. Scholastica, (1970).

PHILIP JOSEPH JANIK (1971)
Assistant Professor of Naval Science.
B.S., Montana, 1967.

ROBERT LEO JARVIS (1971)
Assistant Professor of Wildlife Ecology.
B.S., Humboldt State, 1963, M.S., 1965; Ph.D., Southern Illinois, 1969.

FRANK JAMES JAVOREK (1973)
Research Associate, Western Region Area Development Research Center, Assistant Professor of Psychology (Courtesy).
B.S., Wisconsin, 1967; M.S., Oregon, 1971.

DWIGHT SMITHSON JEFFERS (1957)
Professor Emeritus of Forest Management.
A.B., Illinois Wesleyan, 1906; M.F., Yale, 1911, Ph.D., 1935. Dean and Professor Emeritus, College of Forestry, Idaho.

DEAN PAGET JEFFRESS (1963)
Assistant Professor of English.
B.A., California, 1939.

HUGH FRANK JEFFREY, JR. (1950)
Director of Business Affairs (Associate Professor).
B.S., Oregon State, 1947.

GEORGE MEREDITH JEMISON (1969)
Professor of Forestry.
B.S., Idaho, 1931; M.F., Yale, 1936; Ph.D., Duke, 1942; D.Sc. (Hon.), Idaho, 1967.

WALTER JOHN JENDRZEJEWSKI (1938)
Klamath County Extension Chairman (Associate Professor Emeritus).
B.S., Oregon State, 1938.

GEORGE HERRICK JENKINS (1927)
County Agent (Professor Emeritus), Coos County.
B.S., Oregon State, 1926.

HAROLD DAVID JENKINS (1944)
Professor Emeritus of English.
B.A., Kansas, 1929, M.A., 1931; Ph.D., Yale, 1943.

WILLIAM CHARLES JENNE (1965)
Associate Professor of Sociology.
B.S., Illinois State University, 1953; A.M., Illinois, 1958, Ph.D., 1964.

HAROLD JAMES JENSEN (1950)
Professor of Nematology, Botany and Plant Pathology.
B.S., California, 1947, Ph.D., 1950.

JAMES H. JENSEN (1961)
Professor Emeritus of Botany and Plant Pathology; President Emeritus of Oregon State University.
B.S., Nebraska, 1928, M.A., 1930; Ph.D., Wisconsin, 1935; LL.D., Nebraska, (honorary), 1966; LL.D., North Carolina State, (honorary), 1966.

JOHN GRANVILLE JENSEN (1946)
Professor of Geography.
A.B., Western Washington, 1939; M.A., Clark, 1942, Ph.D., 1946.

LELAND CHRISTIAN JENSEN (1955)
Associate Professor of Electrical and Computer Engineering.
B.S., Oregon State, 1954; M.S., Illinois, 1963.

LOUISA A. JENSEN (1938)
Professor Emeritus of Agronomy.
B.S., Colorado State, 1933.

VARON JENSEN (1973)
Associate Professor of Horticulture (Courtesy).
B.S., Utah State, 1952, M.S., 1956; Ph.D., California at Davis, 1959.

MORRIS S. JIMENEZ (1973)
Assistant Professor of Education.
B.A., Southern Oregon, 1955.

ARTHUR GUY JOHNSON (1966)
Assistant Professor of Radiation Health (General Science); Health Physicist, Radiation Center; Assistant Professor of Nuclear Engineering.
B.S., Missouri, 1956, M.S., 1958.

DONALD JOHNSON (1973)
Research Associate in Oceanography.
B.S., California at Berkeley, 1961; Ph.D., Miami, 1973.

DUANE PAUL JOHNSON (1959)
Extension Specialist 4-H & Youth Development (Associate Professor).
B.S., Iowa State, 1959; M.Ed., Colorado State University, 1970.

ELIZABETH COX JOHNSON (1959-60, 1965)
Assistant Professor of Foods and Nutrition.
B.S., Arizona, 1940, M.S., 1942; Ph.D., Oregon State, 1950.

JAMES WENDELL JOHNSON (1961)
Associate Professor of Forest Products.
B.S., Idaho, 1949; M.S., Oregon State, 1950.

JOHN GRANVILLE JOHNSON (1969)
Associate Professor of Geology.
B.A., UCLA, 1957, M.A., 1959, Ph.D., 1964.

KENNETH NORMAN JOHNSON (1973)
Assistant Professor of Forest Engineering.
B.S., California, 1965; M.S., Wisconsin, 1969; Ph.D., Oregon State, 1973.

LINWOOD EUGENE JOHNSON (1959)
Associate Professor of Mechanical Engineering.
B.S., Oregon State, 1954, M.S., 1955.

MALCOLM JULIUS JOHNSON (1948)
Associate Professor of Agronomy, Superintendent, Central Oregon Experiment Station.
B.S., Oregon State, 1941, M.S., 1954; Ph.D., Purdue, 1961.

MILTON LOUIS JOHNSON (1973)
Instructor in Business Administration.
B.S., Oregon State, 1969.

RICHARD JOHNSON (1972)
Assistant Professor of Oceanography.
B.S., Purdue, 1968; Ph.D., California at San Diego, 1972.

RICHARD ERIC JOHNSON (1964)
Associate Professor of Pharmacy Administration.
B.S., Ohio Northern, 1952; M.S., Pittsburgh, 1961, Ph.D., 1964.

ROBERT E. JOHNSON (1971)
Assistant Professor of Anthropology.
A.B., Stanford, 1967.

SIMON SIGVART JOHNSON (1971)
Assistant Professor of English.
B.A., CSU, 1962; M.S., Columbia, 1963; M.F.A., Iowa 1969, Ph.D., 1972.

STEPHEN HANS JOHNSON (1971)
Assistant Professor of Oceanography.
B.A., Carleton College, 1962; M.S., Minnesota, 1967; Ph.D., Oregon State, 1972.

VICTOR WALDEMAR JOHNSON (1928)
Umatilla County Extension Agent (Professor Emeritus).
B.S., Oregon State, 1928.

WALLACE EARLE JOHNSON (Winter & Spring 1955-56, Fall of 1956-57, and since 1970)
Assistant Director of Information (Assistant Professor).
B.S., Oregon State, 1951; M.S., Oregon, 1959.

W. CURTIS JOHNSON (1968)
Associate Professor of Biochemistry & Biophysics.
B.A., Yale, 1961; Ph.D., Washington, 1966. On leave 1973-74.

ALBERTA BUIS JOHNSTON (1963).
Extension Home Management Specialist (Professor, Home Management).
B.S., Nebraska, 1943; M.S., Kansas State, 1957.

GEORGE McCLELLAN JOHNSTON (1971)
Area Extension Agent (Instructor).
A.A., Hagerstown Junior College, 1964; B.A., George Washington, 1966, M.A., 1973. On leave 1974-1976.

LAREA DENNIS JOHNSTON (1959)
Instructor in Botany, Assistant Curator of Herbarium.
B.A., Willamette, 1957; M.A., Oregon State, 1959.

RICHARD STANLEY JOHNSTON (1966)
Associate Professor of Agricultural Economics.
B.A., Washington State, 1960; M.S., Massachusetts, 1963; Ph.D., California, Berkeley, 1970.

OTMAR JONAS (1968)
Visiting Assistant Professor of German, Modern Languages.
Honors B.A., Utah, 1964; M.A., Oregon, 1965.

DANIEL PATRICK JONES (1970)
Assistant Professor of History of Science (General Science).
B.S., University of Louisville, 1963; A.M., Harvard, 1965; Ph.D., Wisconsin, 1969.

HILDA MEIUS JONES (1947)
Associate Professor of Office Administration.
B.S., Oregon State, 1939; M.S., New York University, 1940.

ROBERT JONES (1962)
Assistant Professor of English.
A.B., Nebraska State Teachers, 1953; M.A., Stanford, 1959.

SIDNEY CARROLL JONES (1930)
Professor Emeritus of Entomology.
B.S., Oregon State, 1926; M.S., Iowa State, 1928.

EARLE FRED JOSSY (1943)
Jackson County Extension Chairman (Associate Professor).
B.S., Oregon State, 1938.

MAJA DESPOT JOVANOVIC (1973)
Physician (Associate Professor), Student Health Center.
M.D., Univ. of Belgrade (Yugoslavia), 1972.

ETTA WESTENHOUSE JUDD (1955)
Head Reference Librarian (Associate Prosor Emeritus).
B.A., Willamette, 1932; B.S. (Lib. Sc.), Illinois, 1935.

DAVID CAMPBELL JUNGE (1971)
Research Associate in Mechanical Engineering.
B.S., Stanford, 1962; Ph.D., Oregon State, 1971.

GRETCHEN SUE JUNK (1973)
Area Head Resident, Housing (Instructor).
B.A., Marietta College, 1968; M.Ed., Vermont, 1971.

ERLAND THEODORE JUNTUNEN (1966)
Senior Instructor in Fisheries.
B.S., Oregon State, 1957, M.S., 1973.

RUDOLPH MARTIN KALLANDER (1961)
Assistant Dean, School of Forestry; Assistant Director, Forest Research Laboratory; Professor of Forest Management.
B.S., Oregon State, 1940, M.F., 1953.

JAMES ALBERT KAMM (1967)
Research Entomologist (Courtesy Associate Professor) USDA-ARS.
B.S., Wyoming, 1962, M.S., 1963; Ph.D., Oregon State, 1967.

RUDOLPH KANGUR (1961)
Assistant Professor Emeritus of Forest Management.
B.S., State University of Tartu (Estonia), 1930, M.S., 1934.

JOSEPH RALPH KANTOR (1965)
Surgical Consultant (Professor), Student Health Service.
B.Sc. in Med., M.D., Nebraska, 1958.

EDWARD LYNN KAPLAN (1961)
Professor of Mathematics.
B.S., Carnegie Institute of Tech., 1941; M.A., Princeton, 1950, Ph.D., 1951.

BARBARA MARBUT KARMEL (1970)
Assistant Professor of Business Administration.
B.A., Cornell, 1954; M.S., Purdue, 1969, Ph.D., 1970.

ARNOLD KAS (1973)
Associate Professor of Mathematics.
B.A., Johns Hopkins, 1962; Ph.D., Stanford, 1966.

LEONARD ALVIN KAUFFMAN (1973)
Assistant Wrestling Coach, Intercollegiate Athletics (Assistant Professor).
B.S., Oregon State, 1965.

MARVIN DEAN KAUFFMAN (1970)
Instructor in Soil Science.
B.S., Oregon State, 1963; M.S., Cornell, 1965.

SHERI JANEAN KAUFFMAN (1970)
Research Associate in Civil Engineering.
B.A., Oklahoma City, 1970; M.Ed., Oregon State, 1972.

ROY SERVAIS KEENE (1947)
Director of Intercollegiate Athletics 1947-1964 (Professor Emeritus).
B.S., Oregon State, 1921.

DAVID BRUCE KEIR (1966)
Coos County Extension Agent (Instructor).
B.S. (Ag. Econ.), Oregon State, 1962, B.S. (B. and T.), 1962.

JOHN PAUL KELLEY (1966)
Associate Professor of Radiological Physics (General Science); X-Ray Science and Engineering Laboratory.
B.S., Rensselaer Polytechnic Institute, 1947.

MARY WALLACE KELSEY (1958)
Assistant Professor of Foods and Nutrition.
B.S., New York State University Teacher's College (Plattsburgh), 1955; M.S., Rhode Island, 1957.

JOHN WILLIAM KELTNER (1963)
Professor of Speech Communication.
B.Ed., Illinois State Normal, 1940; M.A., Northwestern, 1943, Ph.D., 1947.

LORA IVES KELTS (1944)
Agriculture-Forestry Librarian (Professor Emeritus).
B.A., California (at Los Angeles), 1941; Certificate of Librarianship, California, 1942.

LEON KEMPNER JR. (1973)
Instructor in Civil Engineering.
B.S.C.E., Nebraska, 1972.

LARRY JON KENNEKE (1970)
Assistant Professor of Industrial Education.
B.S., Northern Illinois, 1961, M.S., 1965, Ed.D., Oregon, 1968.

WALTER HERBERT KENNICK (1959)
Associate Professor of Animal Science.
B.S., Clemson College, 1948; M.S., Oregon State, 1958, Ph.D., 1959. On sabbatical 1973-74.

CLYDE KERNEK (1955)
Surgical Consultant, Student Health Service (Professor).
B.S., Oklahoma, 1935, M.D., 1937.

HAROLD EDWARD KERR (1960)
Morrow County Extension Chairman (Associate Professor).
B.S., Oregon State, 1957; M.Ed., Colorado State, 1968.

DONNA L. KETTLER (1973)
Assistant Professor of Pharmacy.
B.S., Oregon State, 1971; M.S., Washington, 1974.

JUNE R. KEY (1969)
Instructor in Education; Associate Director of Supervision, Portland Urban Teacher Education Program.
B.A., Wiley College, 1938; M.A., Oregon State, 1971.

ROBERT D. KIEKEL (1966)
Associate Professor of Spanish and Linguistics, Modern Languages.
B.A., Willamette, 1956; M.A., Washington, 1962; Ph.D., Oregon, 1971.

JOHN A. KIESOW (1957)
Extension Area Supervisor (Associate Professor).
B.S., Oregon State, 1954; M.Ed., Maryland, 1964; Ed.D., North Carolina State, 1972.

PAUL E. KIFER (1973)
Professor and Head of Food Science and Technology.
B.S., Michigan State, 1950, M.S., 1953, Ph.D., 1956.

ULO KIIGEMAGI (1971)
Senior Instructor in Agricultural Chemistry.
B.A., Lewis and Clark, 1953.

KENNETH JAY KILLINGSWORTH (1969)
Wheeler County Extension Chairman (Assistant Professor).
B.A., Washington State, 1940; M.Agr., Oregon State, 1970.

DONALD JEROME KIMELDORF (1967)
Professor of Radiation Biology, (General Science).
B.A., Reed College, 1942; M.A., Oregon, 1944; Ph.D., California (Los Angeles), 1947.

MICHAEL PAUL KINCH (1969)
Assistant Science-Technology Librarian (Instructor).
B.S. (Biology), Portland State, 1968; M. of L., Washington, 1969.

DAVID BURNETT KING (1962)
Associate Professor of History.
B.A., Hamilton, 1951; M.A., Rutgers, 1955; Ph.D., Cornell, 1962.

JOHN PHILLIP KING (1967)
Assistant Professor of Religious Studies.
B.A., Hardin-Simmons University, 1958; B.D., Southwestern Baptist Theological Seminary, 1961; M.A., Emory University, 1967.

KEITH IRL KING (1970)
Instructor in Biology (General Science).
B.S., Montana State, 1963; M.S., Oregon State, 1970.

ROGER EDWARD KING (1954)
Associate Professor of English and English Education.
A.B., Northern Colorado, 1950, M.A., 1954.

KENNETH K. KINGSLEY (1974)
Extension Communication Specialist (Assistant Professor).
B.A., Kansas State, 1964, M.S., 1973.

JOHN ROLLAND KINNEY (1969)
Assistant Professor of Mechanical Engineering.
B.S.M.E., Colorado, 1959; M.S.M.E., New Mexico State, 1968, ScD.M.E., 1971.

DALE EARL KIRK (1942)
Professor of Agricultural Engineering.
B.S., Oregon State, 1942; M.S., Michigan State, 1954.

LESTER ALLEN KIRKENDALL (1949)
Professor Emeritus of Family Life.
B.S., Kansas State, 1928; M.A., Columbia. 1931, Ph.D., 1937.

ERNEST JOHN KIRSCH (1946)
Union County Extension Chairman (Professor).
B.S., Oregon State, 1940; M.S., Purdue, 1942.

THEODORE PATRICK KISTNER (1972)
Associate Professor of Veterinary Parasitology.
D.V.M., Ohio State, 1955; M.S., Georgia, 1969.

GEORGE deVRIES KLEIN (1974)
Visiting Professor of Oceanography.
B.A., Wesleyan, 1954; M.A., Kansas, 1957; Ph.D., Yale, 1960.

GLENN ARTHUR KLEIN (1952)
Extension Specialist, Leadership Development; Associate Professor of Extension Education.
B.S., Oregon State, 1951; M.A., University of Maryland, 1962.

LEONARD MARTIN KLEIN (1939)
Associate Professor of Agricultural Engineering (Courtesy); Project Leader, Seed Harvesting and Processing Equipment Projects, USDA.
B.S., Oregon State, 1938.

RICHARD CRAIG KLEIN (1974)
Instructor in Business Administration.
B.A., DePauw, 1969; M.B.A., Southern Methodist, 1971.

LLOYD W. KLEMKE (1970)
Assistant Professor of Sociology.
B.A., UCLA, 1963; M.A., San Fernando Valley State College, 1965; Ph.D., Oregon, 1969.

WILLIAM ALAN KLINE (1972)
Assistant Professor of Education.
B.A., San Jose State, 1957, M.A., 1966; Ph.D., Stanford, 1974.

PETER C. KLINGEMAN (1966)
Associate Professor of Civil Engineering.
B.S., Northwestern, 1957, M.S., 1959; Ph.D., California (Berkeley), 1965. On sabbatical 1973-74.

J. GILBERT KNAPP (1960)
Associate Professor of Music.
B.S., Bradley University, 1952; M.M., Lewis and Clark College, 1961. On sabbatical 1973-74.

STUART EDWARD KNAPP (1959)
Dean of Undergraduate Studies; Professor of Veterinary Parasitology.
B.S., Pacific University, 1950, M.S., 1952; M.S., Idaho, 1953; Ph.D., Kansas State, 1958.

CAROL ALICIA KNOTHE (1972)
Extension Home Economist, Malheur County (Instructor).
B.S., Nebraska, 1962; M.HEc., Oregon State, 1971.

JAMES GEORGE KNUDSEN (1949-52, 1953)
Associate Dean, School of Engineering; in charge of Engineering Experiment Station; Professor of Chemical Engineering.
B.S., Alberta, 1943, M.S., 1944; Ph.D., Michigan, 1949.

DONALD M. KNUTSON (1971)
Assistant Professor of Plant Pathology (Courtesy); Plant Pathologist, U. S. Forest Service.
B.S., Minnesota, 1957, Ph.D., 1968.

CARL ALVIN KOCHER (1973)
Assistant Professor of Physics.
A.B., California (Berkeley), 1963, Ph.D., 1967.

RICHARD M. KOEPER (1973)
Assistant Football Coach, Intercollegiate Athletics (Instructor).
B.S., Oregon State, 1968, M.S., 1973.

PAUL ARTHUR KOEPSELL (1969)
Extension Service, Assistant Professor, Botany and Plant Pathology.
B.S., California (Davis), 1962, Ph.D., 1968.

LOREN D. KOLLER (1972)
Veterinary Pathologist, Research Associate in Veterinary Medicine.
D.V.M., Washington State, 1965; M.S., Wisconsin, 1969; Ph.D., 1971.

AGNES KOLSHORN (1929)
Extension Nutrition Specialist (Professor Emeritus).
B.S., Oklahoma State, 1913; B.S., Columbia, 1918; M.A., Denver, 1919.

PAUL DOUGLAS KOMAR (1970)
Assistant Professor of Oceanography.
B.A., Michigan, 1962, M.S. (Math), 1963, M.S. (Geol), 1966; Ph.D., California at San Diego, 1969.

RICHARD GRANT KORN (1973)
Instructor in Business Administration.
B.S., Oregon State, 1970, M.B.A., 1973.

WILLIAM ARTHUR KOSKI (1950)
Professor and Head of Health.
B.S., Oregon State, 1949; M.S., Michigan, 1950; Ed.D., Oregon State, 1954; M.P.H., California, 1959.

CLIFFORD ALFONS KOTTMAN (1969)
Assistant Professor of Mathematics.
B.S., Loyola U. at Los Angeles, 1964; M.S., Iowa, 1966, Ph.D., 1969.

CHARLES JAMES KOZLIK (1961)
Assistant Professor of Forest Products.
B.A., Doane College, 1952; M.F., Duke, 1957.

WALTER CARL KRAFT (1950)
Professor of German and Linguistics.
B.A., Oregon, 1938, M.A., 1941; Ph.D., California (Berkeley), 1950.

ROBERT LEE KRAHMER (1962)
Associate Professor of Forest Products.
B.S., Oregon State, 1958, M.S., 1960; Ph.D., New York State, 1962.

LEWIS J. KRAKAUER (1971)
Associate Professor of Health (Courtesy).
M.D., Harvard Medical School, 1951.

GERALD WILLIAM KRANTZ (1955)
Professor of Entomology.
B.S., Pittshurgh, 1951; Ph.D., Cornell, 1955.

JOHN CHARLES KRAUSS (1970)
Medical Consultant, Student Health Service (Professor).
A.B., Hope College, 1959; M.D., Wayne State, 1963.

ROBERT WALLFAR KRAUSS (1973)
Dean, College of Science; Professor of Botany and Plant Pathology.
B.A., Oberlin, 1947; M.S., Hawaii, 1949; Ph.D., Maryland, 1951.

REBECCA A. KREAG (1973)
Area Extension Agent (Assistant Professor).
A.B., Michigan, 1970, M.S., 1972.

LAWRENCE JAMES KRONE (1972)
Assistant Professor of Health.
B.S., North Park College, 1963; M.P.H., Yale, 1967; Ph.D., Illinois, 1971; R.S., 1973.

WARREN ERVIND KRONSTAD (1959)
Professor of Plant Breeding, Agronomic Crop Science.
B.S., Washington State, 1957, M.S., 1959; Ph.D., Oregon State, 1963.

HUGO MARTIN KRUEGER (1948)
Professor Emeritus of Physiology, Fisheries and Wildlife.
A.B., Denver, 1924, M.A., 1926; Ph.D., Michigan, 1930.

JAMES HARRY KRUEGER (1961)
Associate Professor of Chemistry.
B.S., Wisconsin, 1958; Ph.D., California, 1961.

JUDITH CROOKHAM KRUEGER (1966)
Instructor in Music.
B.A., Idaho, 1957; M.A., Oregon State, 1965.

WILLIAM C. KRUEGER (1971)
Assistant Professor of Rangeland Resources; Extension Rangeland Resources Specialist.
B.S., Saint Mary's College, 1964; M.S., Humboldt State, 1970; Ph.D., Utah State, 1970.

PAUL HENRY KRUMPERMAN (1966)
Associate Professor of Food Science and Technology.
B.S., Brigham Young, 1949; M.S., Utah State, 1950; Ph.D., California, 1964.

JAMES THEODORE KRYGIER (1954)
Coordinator, Forestry Extension, Professor of Forestry.
B.S., Utah State, 1952, M.S., 1955; Ph.D., Colorado State, 1971.

LEE WALLACE KUHN (1946)
Professor of Wildlife Ecology.
B.S., Iowa State, 1940; M.S., Oregon State, 1942.

LaVERNE DUANE KULM (1964)
Associate Professor of Oceanography.
B.A., Monmouth College, 1959; Ph.D., Oregon State, 1965.

PIJUSH KUNDU (1973)
Research Associate in Oceanography.
B.S., Calcutta, 1963; M.S., Roorkee (India), 1965; Ph.D., Pennsylvania State, 1972.

EDITH CARTER KUNEY (1910-15, 1925)
Associate Professor Emeritus of Modern Languages.
A.B., Willamette, 1909; A.M., Stanford, 1925.

BERRY TED KUNTZ (1973)
Instructor in Agricultural Economics.
B.S., Oklahoma State, 1962, M.S., 1964.

ERVIN FREDERICK KURTH (1945)
Professor Emeritus of Chemistry.
B.S., Wisconsin, 1927, M.S., 1929, Ph.D., 1933. Retired.

GEORGE BRADFORD LaBAUN (1958)
Associate Professor of Civil Engineering.
B.S., Oregon State, 1958, M.S., 1960.

HARRY BERT LAGERSTEDT (1957)
Associate Professor of Horticulture (Courtesy), Research Horticulturist, USDA.
B.S., Oregon State, 1954, M.S., 1957; Ph.D., Texas A & M, 1965.

JAMES FREDERICK LAHEY (1971)
Professor of Geography.
Ph.B., Wisconsin, 1943, M.S., 1949, Ph.D., 1958.

CHARLOTTE LaVERNE LAMBERT (1966)
Professor and Head of Physical Education.
B.A., Evansville College, 1944; M.A., Iowa, 1949, Ph.D., 1959.

JOHN HERBERT LANDERS, JR. (1950)
Extension Animal Scientist (Professor).
B.S., Missouri, 1942, M.S., 1950; Ph.D., Kansas State, 1966.

ANDREW S. LANDFORCE (1946)
Extension Specialist, Wildlife Management and 4-H and Youth Development (Associate Professor).
B.S., Oregon State, 1942.

WILLIAM MARTIN LANGAN (1935)
Associate Professor Emeritus, School of Agriculture.
B.S., Oregon State, 1945.

CHARLES CLINTON LANGFORD (1970)
Assistant Professor of Sociology.
B.A., Kansas State, 1963, M.A., 1965; Ph.D., Oregon, 1971.

R. DONALD LANGMO (1948)
Associate Professor (Industrial Engineer) Agricultural Economics.
B.S., Oregon State, 1943, B.S., 1950; M.S., UCLA, 1959.

JAMES EDMUND LANNAN JR (1969)
Assistant Professor of Fisheries.
A.A., Santa Barhara City College, 1965; B.A., California at Santa Barbara, 1967, M.A., 1969, Ph.D., 1973.

LLOYD QUENDERBILT LARSE (1940)
Professor Emeritus of Business Education and Office Administration.
B.S., Oklahoma State, 1928; Ed.M., Oklahoma, 1935; Ed.D., Oregon, 1954.

INGVAR LAUREN LARSEN (1962)
Research Associate in Oceanography.
B.S., Portland State College, 1962; M.S., Oregon State, 1970.

KNUD SONDERHEDE LARSEN (1969)
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B.A., California State College at Los Angeles, 1964, M.A., 1966; Ph.D., Brigham Young, 1969.

GARY LEE LARSON (1971)
Research Associate in Fisheries.
B.S., Washington, 1966, M.S., 1969; Ph.D., British Columbia, 1973.

MILTON BYRD LARSON (1952)
Professor of Mechanical Engineering.
B.S., Oregon State, 1950; M.Engr., Yale, 1951; M.S., Oregon State, 1955; Ph.D., Stanford, 1961.

ROBERT ELOF LARSON (1965)
Associate Professor and Head of Pharmacology.
B.S., Washington State, 1957, M.S., 1962; Ph.D., Iowa, 1964.

VAUGHN LEE LARSON (1972)
Instructor in X-Ray Science, General Science.
B.S., Oregon State, 1972.

PATRICIA ANN LASHWAY (1973)
Instructor in Speech Communication (Audiologist).
B.A., Vermont, 1967; M.S., Washington, 1970.

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Professor of Entomology.
B.S., Iowa State, 1950; M.A., Kansas, 1951; Ph.D., California, 1964.

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Professor of Civil Engineering.
B.S., Oregon State, 1958, M.S., 1960; Ph.D., California (Berkeley), 1964.

DENIS PETER LAVENDER (1961)
Professor of Forest Physiology, Forest Management.
B.S., Washington, 1949; M.S., Oregon State, 1958, Ph.D., 1962.

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Associate Professor, Forest Products Chemistry.
B.S.A., University of Toronto, 1955; Ph.D., Ohio State, 1959.

DUNCAN KENNETH LAW (1944)
Associate Professor of Food Science and Technology; Seafoods Lahoratory, Astoria.
B.S., Oregon State, 1944.

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Horticulturist United States Department of Agriculture, Assistant Professor of Horticulture (Courtesy).
B.S., Maryland, 1951, M.S., 1958, Ph.D., 1965.

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Assistant Professor of English.
M.A., Florida State, 1944.

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Assistant Professor of Geology.
B.A., Earlham College, 1965; Ph.D., Stanford, 1968.

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Associate Professor of Health.
B.S., West Virginia, 1963, M.S., 1966, Ed.D., 1969.

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Associate Professor of Civil Engineering.
B.S.C.E., Colorado State, 1959; M.S.C.E., Kansas State, 1965; Ph.D., California at Berkeley, 1970.

CHARLES MORLEY LEACH (1950)
Professor of Plant Pathology.
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Assistant Basketball Coach (Assistant Professor).
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Director (Professor Emeritus), Extension Service.
B.S., Oregon State, 1938; M.P.A., Harvard, 1951.

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B.A., Willamette, 1934; M.S., Oregon State, 1950.

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B.S., Washington State, 1958, M.S., 1960; Ph.D., Illinois, 1965.

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Assistant Professor of Mathematics.
B.S., Stanford, 1964, M.S., 1966, Ph.D., 1969.

JONG SUN LEE (1963)
Research Associate (Associate Professor) in Food Science and Technology.
A.B., California (Berkeley), 1958; M.S., Oregon State, 1962, Ph.D., 1963.

SHAW S. LEE (1970)
Research Associate in Agricultural Chemistry.
B.S., National Taiwan University, 1960; Ph.D., Wayne State, 1967.

SYLVIA LEE (1952)
County Extension Agent Home Economics (Assistant Professor Emeritus), Curry County.
B.S., Washington State, 1927.

SYLVIA LUCILE LEE (1968)
Associate Professor and Head of Home Economics Education.
B.S., Oregon State, 1947; M.A., Teachers College, Columbia, 1959, Ed.D., 1966.

WILLIAM ORVID LEE (1956)
Assistant Professor of Agronomy (Courtesy); Research Agronomist, USDA.
B.S., Utah State, 1950, M.S., 1954; Ph.D., Oregon State, 1965.

ALBERT LEWIS LEELAND (1954)
Professor of Elementary Education.
A.B., Colorado State College, 1947, M.A., 1949; Ed.D., Columbia, 1952.

R. LUCILLE REES LEELAND
Professor of Education; Coordinator, Elementary Education.
B.S., Oregon, 1950, M.Ed., 1955; D.Ed., Oregon, 1965.

DARLYNE LYNN LEETE (1970)
Instructor in Physical Education.
B.S., Wisconsin, 1969; M.S., Smith College, 1970.

JOHN ALVAN LEFFEL (1962)
Washington County Extension Agent (Assistant Professor).
B.S., Ag.Ed., Oregon State, 1955, M.S., Ag.Ed., 1967.

NANCY FARWELL LEMAN (1971)
Instructor in English.
Ph.B., Chicago, 1944; B.A., Tulane, 1946; M.A., Chicago, 1948.

JEROME LLOYD LE MASTER (1928)
Professor Emeritus of Business Law.
Jur.D., Illinois, 1923; Cert d'A en Droit Civile, Bordeaux, 1924; M.A., Colorado, 1925. Oregon State Bar 1930.

MORRIS LEE LeMAY (1964)
Director, Counseling and Testing Center; Coordinator, University Exploratory Studies Program; Professor of Education.
B.S., McMurry College, 1956; M.A., Colorado, 1961; D.Ed., Oregon, 1966.

MARK RAPHAEL LEMBERSKY (1971)
Assistant Professor of Statistics.
S.B., MIT, 1967; M.S., Stanford, 1968, Ph.D., 1971.

BERLAN LEMON (1959)
Head Adviser, School of Education; Associate Professor of Education.
B.S. (Education), Oregon State, 1941; M.S. (Psychology), Oregon, 1948.

ERWIN BERTRAN LEMON (1911)
Dean Emeritus of Administration (Professor Emeritus).
B.S., Oregon State, 1911.

MARY-LOUISE (BILLIE) LeSUEUR (1965)
Klamath County Extension Agent, Home Economics (Assistant Professor).
B.S., Montana State, 1942.

OCTAVE LEVENSPIEL (1968)
Professor of Chemical Engineering.
B.S., California (Berkeley), 1947; M.S., Oregon State, 1949, Ph.D., 1952.

GLORIA A. LEVINE (1960)
Associate Professor of Spanish, Modern Languages.
B.A., Queen's College, 1945; M.A., New Mexico, 1946.

SHEPARD LEVINE (1954)
Professor of Art.
B.A., New Mexico, 1950, M.A., 1951.

MARGARET KAY LEWIS (1971)
Extension Nutrition Specialist (Assistant Professor, Foods and Nutrition).
B.S., Utah, 1956; M.S., Oregon State, 1972.

MARY EUNICE LEWIS (1928)
Associate Professor Emeritus of Modern Languages.
B.S., George Fox, 1906; A.B., Penn College (Iowa), 1907; M.A., California, 1918; Ph.D., Washington, 1939.

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Research Associate in Agricultural Economics.
B.S., National Taiwan Univ., 1963; M.S., Univ. of the Philippines, 1968; Ph.D., Oregon State, 1973.

LEONARD MORTON LIBBEY (1961)
Research Associate (Associate Professor) in Food Science and Technology.
B.V.A., Massachusetts, 1953; M.S., Wisconsin, 1954; Ph.D., Washington State, 1961.

PHILIP ALLEN LIEBERMAN (1971)
Instructor in Economics.
B.A., California State (Los Angeles), 1966; M.S., California at Berkeley, 1970.

WILLIAM CARLETON LIGHTFOOT (1958)
Assistant Professor of Wildlife Ecology (Courtesy); Game Research Supervisor, Research Division, Oregon Wildlife Commission.
B.S., Oregon State, 1941.

JOHN FRANK LIGON, JR. (1946)
Professor of English; Curriculum Coordinator.
A.B., Vanderbilt, 1938; M.A., Peabody, 1940; Ph.D., Washington, 1961.

SAM TALBERT LIKENS (1951)
Associate Professor of Chemistry (Courtesy), Agricultural Chemistry. Chemist, USDA.
B.S., Oregon State, 1950.

SIBYLLE ELFRIEDE LILLEY (1973)
Visiting Instructor in German.
Dienstprufung fur das Lehramt an Volksschulen, Padagogische Hochschule Stuttgart-Ludwigsburg, 1966, 1968.

EVERETT HOUSTON LILLIG (1970)
Director of Physical Plant; Associate Professor, Engineering Experiment Station.
B.S., Oregon State, 1941.

ROBERT GRANT LINDERMAN (1973)
Associate Professor of Botany and Plant Pathology (Courtesy).
B.A., Fresno State, 1960; Ph.D., California, 1967.

MARILYN JEAN LINDLAND (1973)
Grant County Extension Agent, Home Economics and 4-H (Instructor).
B.S., Oregon State, 1970.

FREDERICK THOMAS LINDSTROM (1966)
Research Associate (Assistant Professor) in Agricultural Chemistry (Courtesy Assistant Professor of Mathematics).
B.S., Oregon State, 1963, M.S., 1965, Ph.D., 1969.

MICHAEL JON LINDSTROM (1973)
Research Associate in Agronomic Crop Science.
B.S., Idaho, 1965, M.S., 1967; Ph.D., Washington State, 1973.

BENJAMIN ALLEN LINSCHOTEN (1972)
Instructor in Military Science; Master Sergeant, U.S. Army.

PETER CHARLES LIST (1967)
Assistant Professor of Philosophy.
B.A., Michigan State, 1961, M.A., 1964, Ph.D., 1969.

ANN LITCHFIELD (1970)
Associate Dean, School of Home Economics; Assistant Director of Extension Service (Professor).
B.A., Wayne State, 1955; M.A., Chicago, 1961, Ph.D., 1964.

EARL MILO LITWILLER (1942)
Professor Emeritus of Food Science and Technology.
B.S., Kansas State, 1924, M.S., 1926; Ph.D., Oregon State, 1944.

HAROLD M. LIVINGSTON (1946)
Professor of Speech Communication; Director of Classroom TV.
A.B., Illinois Wesleyan, 1936; M.A., Colorado, 1941; Ph.D., Southern California, 1961.

DANIEL C. LO (1966)
Instructor in Pharmaceutical Chemistry.
B.S., Oregon State, 1963; M.S., British Columbia, 1966.

CAROL RUTH LOCHER (1973)
Instructor in English.
B.A., Reed College, 1967; M.A., Oregon, 1970, Ph.D., 1973.

ALBERT LOCK (1972)
Assistant Professor of Pharmaceutical Science.
Pharm. D., Univ. of California at San Francisco, 1962; Ph.D., Oregon State, 1972.

CURTIS EUGENE LOEWEN (1971)
Assistant Professor of Agricultural Education.
B.S., Oregon State, 1959, Ed.M., 1964, Ed.D., 1970.

ALBERT VICTOR LOGAN (1946)
Professor Emeritus of Chemistry.
B.A., Willamette, 1924; M.S., Massachusetts Institute of Technology, 1928, Ph.D., 1938.

DENNIS E. LOHR (1972)
Research Associate in Biochemistry and Biophysics.
B.A., Beloit College, 1965; Ph.D., North Carolina, 1970.

PORTER BRONSON LOMBARD (1963)
Professor of Horticulture, Superintendent, Southern Oregon Experiment Station.
B.A., Pomona, 1952; M.S., Washington State, 1955; Ph.D., Michigan State, 1958.

ROSE MARIE LOMONTE (1969)
Head, Serials Department, Library (Associate Professor).
B.S., Univ. of Houston; M.S., Illinois, 1952.

DAVID ROBERT LONG (1947)
Professor of Agricultural Engineering.
B.S., Oregon State, 1947, M.S., 1951, B.S. 1959.

JAMES WALDO LONG (1966)
Professor of Physical Education; Director, Division of Health and Physical Education.
B.S., Missouri Valley College, 1937; M.A., Northwestern, 1939; M.P.H., North Carolina, 1955, Ph.D., 1953.

JAY BASS LONG (1940)
Professor Emeritus of Wildlife Ecology.
B.S., Oregon State, 1939, M.S., 1948.

ARVID TURNER LONSETH (1948)
Professor of Mathematics.
A.B., Stanford, 1935; Ph.D., California, 1939.

WALTER DAVID LOOMIS (1953)
Professor of Biochemistry.
B.S., Iowa State, 1948; Ph.D., California at Berkeley, 1953.

JAMES CHESTER LOONEY (1957)
Associate Professor of Electrical and Computer Engineering.
B.S., Oregon State, 1954, M.S., 1960, E.E., 1963.

STEPHEN F. LOVE (1970)
Assistant Professor of Industrial and General Engineering.
B.S.I.E., Miami, 1963; M.S.I.E., Stanford, 1964, Ph.D., 1968.

WALTER DAVID LOVELAND (1967)
Assistant Professor of Chemistry, Radiation Center.
S.B., MIT, 1961; Ph.D., Washington, 1966.

RONALD PAUL LOVELL (1971)
Assistant Professor of Journalism.
B.A., UCLA, 1959; M.S., 1961.

KUO-CHIN LU (1963)
Associate Professor of Soil Microbiology (Courtesy); Principal Microbiologist and Pathologist, U. S. Forest Service Laboratory.
B.S., University of Nanking, 1937; Ph.D., Oregon State, 1953.

MARTIN JAMES LUDWIG (1949)
Assistant Professor of English.
B.A., Northeastern (Massachusetts), 1947; M.A., Boston, 1949.

MARGARET CATHERINE LUMPKIN (1948)
Professor of Education.
B.S., Women's College of University of North Carolina, 1944; M.S., Wellesley, 1945; Ed.D., Oregon State, 1957.

CRAIG CARL LUNDBERG (1973)
Professor of Business Administration; Chairman of Dept. of Business, Environment and Organizational Behavior.
B.B.A., Washington, 1954, M.B.A., 1957; Ph.D., Cornell, 1966.

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Baker County Extension Agent, Home Economics (Assistant Professor).
B.S., Oregon State, 1966.

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Clackamas County Extension Agent (Assistant Professor).
B.S., Nebraska, 1961.

WALTER I. LUSETTI (1967)
Associate Professor of Spanish and Modern Language Education; Chairman of Department of Modern Languages.
B.A., University of Pittsburgh, 1949, M.Litt., 1950; Ph.D., Oregon, 1967.

CAROLINE G. LYBECK (1962)
Education and Fine Arts Librarian (Associate Professor Emeritus).
B.A., Concordia College, 1932; B.S.L.S., University of Denver, 1941; M.A.L.S., Michigan, 1957.

JOHN HIGGINS LYFORD, JR. (1966)
Associate Professor of Biology (General Science).
B.A., Carleton College, 1950; M.S., Oregon State, 1962, Ph.D., 1966.

JAMES JOSEPH LYNCH (1970)
Assistant Professor of English.
B.A., Long Island University, 1965; M.A., California at Davis, 1968, Ph.D., 1972.

DONALD LAURIE MacDONALD (1962)
Professor of Biochemistry.
B.A., Toronto, 1944, M.A., 1946, Ph.D., 1948.

ELIZABETH MacDONALD (1971)
Research Associate in Microbiology.
B.A., Toronto, 1944, M.A., 1945.

JOHN HOWARD MacDONALD (1951)
Producer-Announcer, KOAC-AM-TV; Senior Instructor, Oregon Educational and Public Broadcasting Service.
B.A., Oregon, 1948.

HARRY JOHN MACK (1955)
Professor of Horticulture.
B.S., Texas A & M, 1950, M.S., 1952; Ph.D., Oregon State, 1955.

MABEL CLAIR MACK (1928)
Assistant Director Emeritus, Cooperative Extension Service (Professor Emeritus).
B.S., Oregon State, 1928, M.S., 1940.

ANDREA C. MACKEY (1938)
Professor Emeritus of Foods and Nutrition.
B.S., M.Sc., Nebraska, 1937; Ph.D., Iowa State, 1945.

DORIS GLASSER MACLEAN (1963)
Assistant Professor of French, Modern Languages.
B.A., Miami, 1947; M.A., Wisconsin, 1950.

IAIN C. MacSWAN (1955)
Extension Plant Pathology Specialist (Professor).
B.S.A., British Columbia, 1942, M.S.A., 1961.

ROBERT WILLIAM MacVICAR (1970)
President Oregon State University; Professor of Chemistry, Departments of Agricultural Chemistry, Biochemistry and Biophysics, and Chemistry.
B.A., Wyoming, 1939; M.S., Oklahoma State, 1940; Ph.D., Wisconsin, 1946.

THEODORE MARTIN MADDEN (1959)
Associate Professor of Psychology.
B.A., Western Washington College of Education, 1946; M.A., Columbia, 1947; Ph.D., Arizona, 1959.

RUSSELL WEBBER MADDOX, JR. (1950)
Professor of Political Science.
B.A., Marshall College, 1946; M.P.A., Wayne, 1948; Ph.D., Illinois, 1953.

VICTOR ARVIEL MADSEN (1963)
Professor of Physics.
B.S., Washington, 1953, Ph.D., 1961.

PHILIP COOPER MAGNUSSON (1946)
Professor of Electrical and Computer Engineering.
B.S., Washington, 1937; M.S., California, 1938; Sc.D., Massachusetts Institute of Technology, 1941; E.E., Washington, 1947.

LARRY J. MAHRT (1972)
Assistant Professor of Atmospheric Sciences.
B.S., Wisconsin, 1967, M.S., 1969, Ph.D., 1972.

BOHDAN MAKSYMIUK (1965)
Principal Entomologist, Forestry Sciences Laboratory and Associate Professor of Entomology (Courtesy).
B.S.F., Michigan, 1953, M.F., 1955; Ph.D., Maryland, 1965.

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B.S., Illinois, 1968; M.B.A., Oregon State, 1972.

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Extension Recreation Specialist (Associate Professor Emeritus).
B.S., Missouri, 1933; M.S., Wisconsin, 1948.

THOMAS EDWARD MALONEY (1969)
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B.A., University of Buffalo, 1949, M.A., 1953.

SARA ELLEN MALUEG (1966)
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B.A., Muskingum College, 1954; M.A., Wisconsin, 1957, Ph.D., 1965.

N. S. MANSOUR (1970)
Extension Vegetable Crops Specialist (Assistant Professor).
B.S., Wisconsin State, 1956; M.S., Wisconsin, 1961; Ph.D., Michigan State, 1966.

THOMAS JOSEPH MARESH (1967)
Associate Professor of Geography.
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PETER MARION MARKGRAF (1967)
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B.S., Oregon State, 1963, M.S., 1970.

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Extension Agricultural Economist (Associate Professor).
B.S., Wisconsin State (River Falls), 1948; M.S., Wisconsin, 1955.

WILLIAM R. MARRIOTT (1968)
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B.S., Cal Tech, 1940, M.S., 1942; M.D., University of Southern California Medical School, 1947.

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B.S., Massachusetts, 1941.

DONALD JOSEPH MARTEL (1947)
Professor of Landscape Architecture.
B.S., Oregon, 1942.

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MAURO EMILIO MARTIGNONI (1965)
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Dipl. Ing., Swiss Federal Institute of Technology, 1950, Dr. rer. nat., 1956.

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B.A., M.A., Kansas, 1927; Ph.D., Cornell, 1939.

CLIFFORD LESLIE MARTIN (1972)
Assistant Professor of Education, Director Manpower and Community College Counselor Program.
B.A., Northwest Nazarene, 1956; M.Ed., Oregon State, 1965, Ph.D., 1973.

DON BRUCE MARTIN (1966)
Assistant Professor of Physical Education.
B.S., Oregon, 1949, M.S., 1950.

GEORGE ROBERT MARTIN (1967)
Associate Professor of Business Administration.
B.B.A., Washington, 1960; Ph.D., California (Berkeley), 1967. C.P.A., Washington, 1960, Oregon, 1968.

GLENN A. MARTIN (1972)
Instructor in Naval Science.
A.S., Mt. San Antonio College, 1970.

JOHN HOLMES MARTIN (1970)
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B.S., Oregon State, 1914; M.S., Maryland, 1921; Ph.D., Minnesota, 1926.

LLOYD WAYNE MARTIN (1967)
Superintendent North Willamette Experiment Station, Associate Professor of Horticulture.
B.S., Oklahoma State, 1958, M.S., 1961; Ph.D., Michigan State, 1967.

WALLACE HOPE MARTIN (1920)
Professor Emeritus of Mechanical Engineering.
M.E., Minnesota, 1910; M.S., Iowa State, 1930.

NORMAN HARRY MARTINSON (1958)
Associate Professor of Physical Education.
B.S., Oregon State, 1948, M.S., 1949.

ELLIOT NELSON MARVELL (1948)
Professor of Chemistry.
B.S., Brown, 1943; Ph.D., Illinois, 1948.

G. JEANNETTE ANN MASILIONIS (1960)
Associate Professor of Physical Education.
B.S., Ohio, 1944, M.S., 1945.

DONALD KENNETH MASON (1974)
Instructor in Business Administration.
B.S., Oregon State, 1967.

RICHARD RANDOLPH MASON (1967)
Forest Insect Ecologist, Forestry Sciences Laboratory; Assistant Professor of Forestry (Courtesy).
B.S.F., Michigan, 1952, M.F., 1956, Ph.D., 1966.

ROBERT GEORGE MASON (1953)
Professor of Sociology, Survey Research Center.
B.S., Oregon State, 1951; M.S., Wisconsin, 1952; Ph.D., Stanford, 1962.

MARY MASSEY (1969, 1972)
Assistant Professor of Family Life.
B.S., Texas Tech., 1958; M.S., Florida State, 1966, Ph.D., 1969.

JOHN WILLIAM MASSIE (1956)
Tillamook County Extension Chairman (Associate Professor).
B.S., Agr., Ohio State, 1951; M.Ag.Ed., Arizona, 1968.

WALTER EDWARD MATSON (1965)
Extension Agricultural Engineer; Professor of Agricultural Engineering.
B.S., Washington State, 1947, M.S., 1953, B.S. Electrical Engineering, 1957.

DONALD EUGENE MATTSON (1965)
Associate Professor of Veterinary Medicine.
B.S., California, Davis, 1957, D.V.M., 1959; Ph.D., Washington State, 1966.

LAUREL SMITH MAUGHAN (1972)
Instructor, Library.
B.A., Utah State, 1968; M.L.S., University of Pittsburgh, 1972; M.A., 1973.

HUBERT E. MAY (1973)
Visiting Professor of Biochemistry and Biophysics.
B.S., Bethany Nazarene, 1956; M.S., Oklahoma, 1960, Ph.D., 1966.

DARRELL CLIFFORD MAXWELL (1952-60, 1963)
Umatilla County Extension Agent (Associate Professor).
B.S., Oregon State, 1952; M.Ed. California, 1970.

JAMES JOSEPH McALISTER (1954)
Extension Specialist 4-H and Youth (Associate Professor).
B.S., Oregon State, 1942; M.S., Oregon, 1970.

LAURA McALLESTER (1926)
Assistant Professor Emeritus of Physical Education.
Diploma, Boston Normal School of Gymnastics, 1906; B.S., Oregon State, 1932.

JAMES ANDREW BELL McARTHUR (1956)
Professor Emeritus of Range Management and Animal Science, Eastern Oregon Experiment Station.
B.Sc., University of Alberta, 1948; M.Sc., Texas A and M, 1950, Ph.D., 1951.

MARJORIE GRACE McBRIDE (1966)
Associate Director, Office of Career-Planning and Placement; Assistant Professor of Education.
B.A., Linfield, 1948; M.A., Syracuse, 1953.

ROBERT F. McCAIN (1969)
Head Adviser School of Business and Technology; Associate Professor of Business Administration.
B.S., Wisconsin, 1949, M.S., 1952, Ph.D., 1954. Licensed Psychologist, Oregon, 1968.

RAYMOND GERALD McCARTY (1953)
Clackamas County Extension Agent (Associate Professor Emeritus).
B.S., Nebraska, 1936; M.S., Missouri, 1938.

JAMES ELIAS McCAULEY (1956-60, 1961)
Associate Professor of Oceanography.
B.S. in Zool., Washington, 1946, M.S., 1949; Ph.D., Oregon State, 1954.

CAROL McCLAIN (1973)
Instructor in Anthropology.
B.A., UCLA, 1962, M.A., 1965.

RONALD R. McCLAIN (1973)
Director, Affirmative Action; Assistant to the President (Acting Instructor).

THOMAS JOHN McCLELLAN (1945-46, 1948)
Professor of Civil Engineering.
B.S., Oregon State, 1945; M.Engr., Yale, 1948.

WILLIAM ANDREW McCLENAGHAN (1949)
Professor of Political Science.
B.A., Washington, 1948.

THOMAS COSHOW McCLINTOCK (1959)
Professor and Chairman of History.
B.A., Stanford, 1949; M.A., Columbia, 1950; Ph.D., Washington, 1959.

PAUL WILLIAM McCORMICK (1965)
Lakes County Extension Agent (Assistant Professor).
B.S., Oregon State, 1965; M.S., Utah State, 1973.

KEITH RUSSELL McCREIGHT (1971)
Financial Aid Counselor (Instructor)
B.S., Nebraska, 1965, M.A., 1967.

DENNIS LESLEY McDONALD (1971)
Assistant Professor of Biology (General Science).
A.A., Concordia College, 1964; B.S., Valpariso University, 1966; Ph.D., Duke, 1971.

MARGUERITA McDONALD (1962)
Engineering Librarian (Associate Professor Emeritus).
B.A., British Columbia, 1925; M.S., Montana State, 1960.

FLOYD BRANT McFARLAND (1963)
Associate Professor of Economics.
B.A., Texas, 1957, M.A., 1959, Ph.D., 1964.

DALE DONALD McFARLANE (1965)
Associate Professor of Business Administration; Chairman, Department of Accounting and Management Science.
B.A., Washington, 1960, M.B.A., 1961; D.B.A., Indiana, 1966.

LOIS ANN McGILL (1945-48, 1952)
Professor of Food Science and Technology.
B.S., Oregon State, 1945.

S. KATHLEEN McGONIGLE (1973)
Assistant Professor of Political Science.
B.A., Gonzaga, 1968.

EDWARD GORHAM McGRATH (1965)
Professor of Political Science.
A.B. with Honors, California, 1939, M.A., 1948; Ph.D., Syracuse, 1961.

WILLIAM SAXON McGUIRE (1956)
Professor of Agronomy.
B.S., Arkansas, 1947; M.S., University of New Zealand, 1951; Ph.D., Washington State, 1952.

DON EDWARD McILVENNA (1965)
Associate Professor of History.
A.B., Sacramento State College, 1952; M.A., California (Berkeley), 1956; Ph.D., Stanford, 1966.

CHARLES DAVID McINTIRE (1964)
Associate Professor of Botany.
B.B.A., Southern Methodist, 1954; B.S., Oregon State, 1958, M.S., 1960, Ph.D., 1964.

JOHN DEMARIS McINTYRE (1964)
Assistant Professor of Fisheries (Courtesy), Assistant Leader, Oregon Cooperative Fishery Unit, Bureau Sport Fisheries and Wildlife.
B.A., Colorado State College, 1964; M.S., Oregon State, 1967, Ph.D., 1969.

WILLIAM WARD McKALIP (1937-42, 1953)
Associate Professor Emeritus of Physical Education.
B.S., Oregon State, 1931, M.S., 1952.

FREDERICK FRANCIS McKENZIE (1944)
Professor Emeritus of Animal Science.
B.S., University of British Columbia, 1921, A.M. 1923; Ph.D., Missouri, 1925; D. Agr. (Hon.) Catholic University of Chile.

MILFORD D. McKIMMY (1953)
Professor of Forest Products.
B.S., Michigan State, 1949; M.S., Oregon State, 1951; Ph.D., New York State College of Forestry, 1955.

EARLE KENNETH McLAREN (1963)
Instructor in Forest Engineering.
B.S., United States Naval Academy, 1934; B.S., Oregon State, 1963.

ROBERT ORMOND McMAHON (1966)
Associate Professor of Forest Economics, Extension Forest Products Marketing Specialist.
B.S., Idaho, 1951, M.F., 1953; Ph.D., California, 1962.

WILLIAM EDGAR McMECHAN (1971)
Assistant Professor of History.
B.A., Washington State, 1958; M.A., Wisconsin, 1967.

WILLIAM D. McMULLEN (1964)
Associate Professor of Metallurgical Engineering.
B.S., Utah, 1955; M.S., Iowa State, 1961; M.S., Lehigh, 1962; Ph.D., Denver, 1964.

CHARLES McNEIL (1965)
Assistant Professor of Physical Education and Assistant Track Coach.
B.A., San Jose State, 1959; M.Ed., Oregon State, 1965.

WILLIAM JOHN McNEIL (1966)
Associate Professor of Fisheries (Courtesy).
B.S., Oregon State, 1952, M.S., 1956; Ph.D., Washington, 1962.

ISABELLA FRANKLIN McQUESTEN (1948)
Professor of Adult Education.
B.S., Arizona, 1932; M.S., Oregon State, 1940.

ROBERT W. McVICAR, JR. (1972)
Instructor in Industrial and General Engineering.
B.S.I.E., California State Polytechnic Institute, 1965; M.S.I.E., Georgia Tech, 1967.

FRANK PADEN McWHORTER (1930)
Professor Emeritus of Plant Pathology; Plant Pathologist, U.S. Department of Agriculture.
B.S., Vanderbilt, 1917; M.S., Chicago, 1920; Ph.D., Cornell, 1928.

MARGARET ELIZABETH MEEHAN (1970)
Instructor in History.
A.B., Rutgers, 1948, M.A., 1950.

THOMAS RICHARD MEEHAN (1962)
Professor of History.
A.B., Rutgers, 1949, M.A., 1951; Ph.D., Wisconsin, 1960.

ANNA RUTH MEEKS (1965)
Professor Emeritus of Education.
A.B., Goucher College, 1926; Ed.M., Maryland, 1947; Ed.D., The George Washington University, 1958.

DONALD MANUELL MEGALE (1958)
Associate Professor of Physical Education.
B.S., Oregon State, 1952, M.Ed., 1958; Ph.D., Utah, 1970.

JOSEPH PARKE MEHLIG (1920)
Professor Emeritus of Chemistry.
B.S., Purdue, 1908, M.S., 1910, Ph.D., 1931.

HARVEY ALEXANDER MEIER (1972)
Extension Agribusiness Economist (Assistant Professor).
B.S., Washington State, 1966; M.S., Arizona, 1968; Ph.D., Ohio State, 1972.

WALTER M. MELLENTHIN (1950)
Professor of Horticulture, Superintendent, Mid-Columbia Experiment Station.
B.S., Oregon State, 1950, M.S., 1952.

JOHN LEROY MELLOTT (1969)
Multnomah County Extension Agent, 4-H and Youth (Assistant Professor).
B.A., Dickinson College, 1962; M.S., Delaware, 1964; Ph.D., Oregon State, 1969.

HASSAN ALY MELOUK (1970)
Research Associate in Botany and Plant Pathology.
B.S., Alexandria University, Egypt, 1962; M.S., Oregon State, 1967, Ph.D., 1969.

JAMES ALEXANDER MELVIN (1972)
Instructor in Business Administration.
B.A., Oregon State, 1971, M.B.A., 1972.

CHARLES G. MEMMINGER (1972)
Professor of Aerospace Studies; Colonel, USAF.
B.S., U.S. Military Academy, West Point, 1946; M.S., George Washington, 1967.

ROBERT EUGENE MEREDITH (1959)
Associate Professor of Chemical Engineering.
B.S., California, 1956, Ph.D., 1959.

FRED MERRYFIELD (1927)
Professor Emeritus of Civil Engineering.
B.S., Oregon State, 1923; M.S., North Carolina, 1930.

RODERICK SMIT MESECAR (1963)
Assistant Professor of Oceanography; Oceanography Technical Planning and Development.
B.S., Oregon State, 1956, M.S., 1958, E.E., 1964, Ph.D., 1967.

EDWIN CHARLES MESLOW (1971)
Assistant Professor of Wildlife Ecology (Courtesy); Assistant Leader, Oregon Cooperative Wildlife Research Unit, Bureau of Sport Fisheries and Wildlife.
B.S., Minnesota, 1959, M.S., 1964; Ph.D., Wisconsin. 1968.

ROBERT J. METZGER (1954)
Professor of Cytogenetics (Courtesy); Wheat Geneticist, USDA.
B.S., Illinois, 1948, M.S., 1949, Ph.D., 1953.

STUART MILES METZGER (1962)
Associate Professor of Architecture and Landscape Architecture, Associate Director Facilities Planning.
B.Arch., Washington, 1961.

EDWIN DAVID MEYER (1925)
Associate Professor Emeritus of Industrial Arts.
B.S., Stout Institute, 1927; M.S., Oregon State, 1940.

ROBERT EMERSON MICHAEL (1968)
Assistant Professor of Physical Education, Assistant Intramural Director.
B.S., North Central College, 1962; M.S., Northern Illinois University, 1966; Ed.D., Oregon, 1972.

ROBERT RAY MICHAEL (1947)
Associate Professor of Electrical and Computer Engineering.
B.S., Oregon State, 1940, M.S., 1947.

FRANK CLIFFORD MICHEL (1970)
Counselor, Counseling Center (Instructor).
B.S., Washington State, 1961; M.Ed., Arkansas, 1967. On leave 1973-74.

OSCAR EDWIN MIKESELL (1934)
Linn County Extension Chairman (Professor).
B.S., Oregon State, 1934.

JOHN A. MILBRATH (1937)
Professor Emeritus of Plant Pathology.
B.S., Washington State, 1934; Ph.D., Oregon State, 1938. Retired.

DENNIS GORDON MILES (1971)
Assistant Director for Broadcast Media (Instructor), Department of Information.
B.S., Oregon State, 1967.

STANLEY DONOVAN MILES (1966)
Extension Economist (Instructor), Manpower Development.
B.S., North Dakota State, 1965; M.S., Oregon State, 1971.

RAYMOND EAGAN MILLEMANN (1963)
Professor of Fisheries.
A.B., Dartmouth, 1948; M.A., California (Los Angeles), 1951, Ph.D., 1954.

CHARLES B. MILLER (1970)
Assistant Professor of Oceanography.
B.A., Carleton College, 1963; Ph.D., California, 1969.

DONALD JAMES MILLER (1961)
Assistant Professor of Forest Products.
B.S., Connecticut, 1951; M.F., Yale, 1954.

JAMES CARLTON MILLER (1958)
Professor Emeritus of Animal Science.
B.S., Missouri, 1928, M.S., 1929, Ph.D., 1937.

LORRAINE THERESA MILLER (1966)
Associate Professor of Foods and Nutrition.
B.S., Wisconsin, 1953, M.S., 1958, Ph.D., 1967.

MELVIN D. MILLER (1968)
Associate Professor of Education, Assistant to Coordinator of Vocational Education.
B.S., Oregon State, 1953, Ed.M., 1961, Ed.D., 1970.

PATRICIA RAY MILLER (1972)
Douglas County Extension Agent (Instructor).
B.S., Oregon State, 1971.

PAUL WILLIAM MILLER (1930)
Professor Emeritus of Plant Pathology; Research Plant Pathologist, U.S. Department of Agriculture.
B.S., Kentucky, 1923, M.S., 1924; Ph.D., Wisconsin, 1929. Retired.

RALPH HOWARD MILLER (1970)
Head Basketball Coach (Professor).
B.S., Kansas, 1942.

STANLEY FRANK MILLER (1973)
Associate Professor of Agricultural Economics, International Plant Protection Center; Director, OSU/AID Weed Control Project.
B.S., Brigham Young, 1960; M.S., Utah State, 1962; Ph.D., Oregon State, 1965.

TERRY L. MILLER (1970)
Research Associate in Agricultural Chemistry.
B.A., San Diego State, 1964, M.S., 1965; Ph.D., Oregon State, 1969.

HOWARD P. MILLEVILLE (1969)
Extension Food Technology Specialist, Marketing (Associate Professor).
B.S., Illinois Institute of Technology, 1936.

MARGARET MILLIKEN (1947)
Associate Professor of Resource Recreation Management.
B.S., Oregon State, 1942, M.S., 1947.

WILLIAM WILLIS MILLS (1954)
Professor Emeritus of Psychology.
A.B., St. Louis, 1939; Ph.D., Minnesota, 1954.

BETTY EMERY MINER (1972)
Visiting Instructor in Foods and Nutrition.
B.S., Kansas State, 1959, M.S., 1960.

JOHN RONALD MINER (1972)
Associate Professor of Agricultural Engineering.
B.S., Kansas, 1959; M.S., Michigan, 1960; Ph.D., Kansas State, 1967.

JOHN GLENN MINGLE (1960)
Professor of Mechanical Engineering.
B.S.M.E., Purdue, 1942; M.S., Oregon State, 1949.

KENNETH CLAYTON MINNICK (1944)
Benton County Extension Agent, 4-H Club (Associate Professor).
B.S., Oregon State, 1939, M.Agr., 1954.

MIRIAM SHARP MINNICK (1957)
Inter-Library Loan Librarian (Associate Professor).
B.A., Western Reserve, 1934, M.S. in L.S., 1951.

DON MINORE (1966)
Plant Ecologist Forestry Sciences Laboratory, U. S. Forest Service; Assistant Professor of Forestry (Courtesy).
B.S., Minnesota, 1953; Ph.D., California (Berkeley), 1966.

RUSSEL GENE MITCHELL (1969)
Insect Ecologist, Assistant Professor (Courtesy), Forestry Sciences Laboratory, U. S. Forest Service.
B.S., Oregon State, 1956; M.S., Syracuse, 1957; Ph.D., Oregon State, 1960.

VELMA ROBERTA MITCHELL (1958)
Lane County Extension Agent, Home Economics (Associate Professor).
B.S., Oregon State, 1945.

MICHAEL CARY MIX (1970)
Assistant Professor of Biology (General Science).
B.S., Washington State, 1963; Ph.D., Washington, 1970.

RONALD T. MOBLEY (1968)
Malheur County Extension Agent, 4-H and Youth, (Instructor).
B.S., Oregon State, 1967.

HAROLD WILLIAM MOE (1935-42, 1949)
Associate Professor of Physical Education.
B.S., Oregon State, 1935, M.S., 1952.

LORENCE CARL MOELLER, JR. (1973)
Assistant Professor of Industrial Education.
B.S., Iowa State, 1964; M.A., Chapman, 1971.

RONALD RUTT MOHLER (1972)
Professor and Head of Electrical and Computer Engineering.
B.S., Pennsylvania State, 1956; M.S., USC, 1958; Ph.D., Michigan, 1965.

KARL HERMAN MOLTMANN (1956)
Associate Professor of Music.
B.A., Buena Vista College, 1937; M.M., Colorado, 1946.

JOSEPH GERARD MONKS (1967)
Associate Professor of Business Administration.
B.S., Gonzaga, 1955; M.B.A., Washington, 1965, B.S., 1967, Ph.D., 1967, Registered Mechanical and Industrial Engineer, Washington, 1966; Oregon, 1968.

CAL GRAHAM MONROE (1942)
Assistant State 4-H & Youth Leader (Professor Emeritus).
B.S., Oregon State, 1939; M.S., Cornell, 1952; A.G.S., Maryland, 1963.

J. SERGIO MONTES (1973)
Assistant Professor of Civil Engineering.
C.E. Degree, Univerity of Chile, 1961; Ph.D., MIT, 1973.

MARVIN LEONARD MONTGOMERY (1954)
Senior Instructor in Agricultural Chemistry.
B.A., Linfield, 1954.

MORRIS W. MONTGOMERY (1961)
Associate Professor of Food Science and Technology.
B.S., North Dakota State, 1951, M.S., 1957; Ph.D., Washington State, 1961. On sabbatical 1973-74.

HELEN STERLING MOOR (1926-28, 1954-1966)
Dean of Women Emeritus (Professor Emeritus).
A.B., Smith, 1925; M.A., Stanford, 1935.

BERNARD J. MOORE (1970)
Plant Clinic Technician (Instructor), Plant Pathology.
B.S.A., Arkansas, 1952, M.S., 1961.

DAVID P. MOORE (1960)
Professor of Soil Science; Assistant Director, Agricultural Experiment Station.
B.S., North Carolina State, 1953, M.S., 1955; Ph.D., California, 1960.

DORIS EVELYN MOORE (1971)
Lane County Extension Agent (Instructor).
B.S., Alcorn A & M, 1971.

DUANE GREY MOORE (1965)
Soil Scientist-Chemist (Courtesy Associate Professor), U. S. Forest Service.
B.S., Wisconsin, 1953, M.S., 1955, Ph.D., 1960.

LARRY WALLACE MOORE (1969)
Assistant Professor of Plant Pathology.
B.S., Idaho, 1962, M.S., 1964; Ph.D., California, Berkeley, 1970.

MICHAEL P. MOORE (1972)
Assistant Professor of Naval Science.
B.S., U.S. Naval Academy, 1968.

SYLVIA LEE MOORE (1966)
Assistant Professor of Physical Education.
B.A., Washington, 1963; M.S., Oregon, 1966.

THEODORE CARLTON MOORE, JR (1968)
Associate Professor of Oceanography.
B.S., North Carolina; Ph.D., UCSD (Scripps Institute of Oceanography), 1968.

THOMAS CARROL MOORE (1963)
Professor of Botany and Chairman of Botany and Plant Pathology.
B.A. (Biology), North Texas State, 1956; M.A. (Botany), Colorado, 1958; Ph.D. (Botany), 1961.

LAURA LARISA MORGAN (1973)
Foreign Study Advisor, Assistant Foreign Student Advisor (Assistant Professor).
B.A., Miami, 1969, M.Ed., 1971.

MAX EUGENE MORGAN (1970)
Professor of Food Science and Technology.
B.S., Washington State, 1939; M.S., Connecticut, 1941; Ph.D., Iowa State, 1948.

RICHARD Y. MORITA (1962)
Professor of Microbiology and Oceanography.
B.S., Nebraska, 1947; M.S., USC, 1949; Ph.D., California, Scripps Institution of Oceanography, 1954.

MARJORIE KUH MORRAY (1968)
Assistant Professor of English.
A.B., Chicago, 1940; M.A., California, 1964.

JAMES MADISON MORRIS (1928)
Professor Emeritus, Continuing Education Publications, Division of Continuing Education.
B.S. (E. Eng.), Oregon State, 1928, Ed.D., 1956.

JOHN EDWARD MORRIS (1968)
Assistant Professor of Zoology.
B.A., Stanford, 1958; M.S., Hawaii, 1960; Ph.D., U.C.L.A., 1966.

LESLEY FRANCES MOORE MORRIS (1969)
Assistant Professor of Family Life.
B.S., Oregon State, 1961, M.S., 1969.

ROBERT JAMES MORRIS, JR. (1965)
Associate Professor of History of Science (General Science).
B.S., United States Military Academy, West Point, 1954; M.G.E. (Geological), Oklahoma, 1961; Ph.D., 1965.

ROY OWEN MORRIS (1961)
Associate Professor of Chemistry, Agricultural Chemistry.
B.Sc., London, 1955, Ph.D., 1959.

RUTH ANNETTA MOSER (1946)
Associate Professor of Clothing, Textiles, and Related Arts.
B.S., North Dakota State, 1931; M.S., Oregon State, 1950.

WAYNE DELBERT MOSHER (1948)
Douglas County Extension Agent (Associate Professor).
B.S., Oregon State, 1948.

DAVID ANTHONY MOUAT (1972)
Resource Analyst Environmental Remote Sensing Application Laboratory, Assistant Professor of Geography.
B.A., California at Berkeley, 1966; M.A., Kent State, 1968.

ROBERT VERNON MRAZEK (1960)
Professor of Chemical Engineering.
B.S. (Ch.E.), Purdue, 1957; Ph.D. (Ch.E.), Rensselaer Polytechnic Institute, 1960.

KEITH W. MUCKLESTON (1964)
Associate Professor of Geography.
B.A., Washington, 1970; M.A., 1963; Ph.D., 1970.

TERRY LEE MULLEN (1973)
Instructor in Zoology.
B.A., Central Washington State, 1969, M.S., 1971.

DWIGHT CURTIS MUMFORD (1938)
Professor Emeritus of Agricultural Economics.
B.S., Illinois, 1923; M.S., Cornell, 1925.

ROBERT CHARLES MUNDT (1968)
Station Manager, KOAC AM-TV, (Assistant Professor) Oregon Educational and Public Broadcasting Service.
B.A., St. Francis, 1947; M.S., Southern California, 1962.

JAMES KENNETH MUNFORD (1939-46, 1948)
Director of Publications and Oregon State University Press; Professor of Education.
B.S., Oregon State, 1934; Ed.D., Stanford, 1948.

ALAN ALEXANDER MUNRO (1962)
Professor of Art.
B.A., George Peabody College, 1952; M.F.A., Wichita, 1956.

BENJAMIN PETER MURDZEK (1967)
Associate Professor of History.
B.A., American University, 1950, Ph.D., 1960.

THOMAS A. MURPHY (1963-66, 1968)
Assistant Professor of Psychology.
B.A., Michigan State, 1959, M.A., 1961.

RJAY MURRAY (1966)
Research Associate, Computer Center.
B.S. Utah, 1957; M.S., Auburn University, 1966.

GARY LOREN MUSSER (1972)
Assistant Professor of Mathematics.
B.S., Michigan, 1961, M.S., 1963; Ph.D., Miami, 1970.

OTTO HERBERT MUTH (1929)
Professor Emeritus of Veterinary Medicine.
D.V.M., Michigan State, 1929, M.S., 1935.

H. JOE MYERS (1948)
Assistant Director, Extension Service (Professor).
B.S., Oregon State, 1949; M.S., Michigan State, 1960.

DAVID STUART NACHTWEY (1968)
Associate Professor of Radiation Biology, (General Science).
B.A., Washington, 1951; M.A., Texas, 1956; Ph.D., Stanford, 1961.

KEN G. NAFFZIGER (1971)
Counselor, Counseling Center (Assistant Professor).
B.A., Carthage, 1958; M.A., Moorhead State, 1964; Ph.D., Oregon, 1971.

WILLIAM PAYNE NAGEL (1962)
Associate Professor of Entomology.
B.S., New York State College of Forestry, 1953, M.S., 1957; Ph.D., Cornell, 1962.

M. N. L. NARASIMHAN (1966)
Professor of Mathematics.
B.S., University of Mysore, M.S., 1951; Ph.D., Indian Institute of Technology, Kharagpur, 1958. On sabbatical 1972-73.

JOHN HENRY NATH (1970)
Professor of Mechanical Engineering; Director, OSU Fluids Dynamics Laboratory.
B.S., University of Colorado, 1952, M.S., 1960; Ph.D., MIT, 1967.

VICTOR THOMAS NEAL (1964 Winter, Fall, 1966)
Assistant Professor of Oceanography.
B.S., Notre Dame, 1948; M.Ed., North Dakota, 1954; Ph.D., Oregon State, 1965.

A. GENE NELSON (1969)
Extension Farm Management Specialist (Assistant Professor).
B.S., Western Illinois, 1964; M.S., Purdue, 1967, Ph.D., 1969.

EARL EDWARD NELSON (1963)
Assistant Professor of Plant Pathology (Courtesy); Plant Pathologist, Forestry Sciences Laboratory.
B.S., Oregon State, 1957, Ph.D., 1962.

HERBERT BENJAMIN NELSON (1927)
Professor Emeritus of English.
A.B., Colorado, 1926, M.A., 1927; Ph.D., Washington, 1944.

MILTON NELS NELSON (1926)
Professor Emeritus of Economics.
A.B., Illinois, 1915, M.A., 1917, Ph.D., 1921.

PAUL BURGERT NELSON (1959)
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B.A., Westmar College, 1951; M.A., Colorado, 1955, Ph.D., 1966.

RICHARD CORNELIUS NELSON (1972)
Assistant Professor of Military Science, Captain, U.S. Army.
B.S., Oregon State, 1965.

SUSAN WILEY NESBITT (1971)
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B.S., Idaho, 1964; M.A., Washington State, 1966.

STEPHEN JOSEPH NESHYBA (1965)
Associate Professor of Oceanography.
B.S., Texas, 1949, M.S., 1954; Ph.D., Texas A&M, 1965.

ROBERT WARREN NEWBURGH (1953)
Professor of Biochemistry; Chairman, Biochemistry & Biophysics.
B.S., Iowa, 1949; M.S., Wisconsin, 1951, Ph.D., 1953.

STUART MARSHALL NEWBERGER (1969)
Associate Professor of Mathematics.
B.E.E., City College of New York, 1960; Ph.D., MIT, 1964.

BEN ALLEN NEWELL (1944)
Marion County Extension Chairman (Professor Emeritus).
B.S., Oregon State, 1941.

BYRON LOUIS NEWTON (1947-48, 1949)
Professor of Business Administration.
B.S., Northwestern (Oklahoma), 1935; M.S., Oklahoma State, 1939, Ed.D., 1946.

MICHAEL NEWTON (1960)
Associate Professor of Forest Ecology.
B.S., Vermont, 1954; B.S., Oregon State, 1959, M.S., 1960, Ph.D., 1964.

CHARLES AMOS NEYHART, JR. (1973)
Assistant Professor of Business Administration.
B.S., The Pennsylvania State University, 1968, M.B.A., 1969, Ph.D., 1973.

JOSEPH WILLIAM NIBLER (1967)
Associate Professor of Chemistry.
B.S., Oregon State, 1963; Ph.D., California (Berkeley), 1966.

WILLIAM GERALD NIBLER (1940)
Assistant Director, Extension Service (Professor).
B.S., Oregon State, 1938; M.Ed., Maryland, 1962.

KARL JACOB NICE (1969)
Assistant Professor of Science Education.
B.S., Indiana State, 1958, M.S., 1965; Ph.D., Iowa, 1969.

DAVID BOWMAN NICODEMUS (1950)
Professor of Physics, Dean of Faculty.
A.B., DePauw, 1937; Ph.D., Stanford, 1946.

ALAN RANDOLPH NIEM (1970)
Assistant Professor of Geology.
B.S., Antioch College, 1966; M.S., Wisconsin, 1968, Ph.D., 1971.

JOSEPH EUGENE NIXON (1968)
Research Associate (Assistant Professor) in Food Science and Technology.
B.S., Illinois, 1961, Ph.D., 1965.

MARY LEE NOLAN (1973)
Assistant Professor of Geography.
B.A., Louisiana State, 1957; M.A., Sam Houston State, 1963; M.A., Texas, 1967; Ph.D., Texas A & M, 1972.

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Instructor in Recreational Resource Management.
B.A., Louisiana State, 1957; M.A., Texas, 1966.

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Research Associate in Zoology.
A.A., Clark College, 1965; B.A., Central Washington State College, 1967; M.S., Oregon State, 1969, Ph.D., 1972.

JOEL ARVID NORGREN (1972)
Research Associate in Soil Science.
B.S., Cornell, 1954; M.S., Oregon State, 1962, Ph.D., 1972.

FAITH GRIGSBY NORRIS (1947)
Professor of English.
B.A., British Columbia, 1939; M.A., California, 1941, Ph.D., 1947.

LOGAN A. NORRIS (1961)
Assistant Professor of Agricultural Chemistry (Courtesy); Principal Chemist, Project Leader, U. S. Forest Service.
B.S., Oregon State, 1961, M.S., 1964; Ph.D., 1970.

THOMAS HUGHES NORRIS (1947)
Professor of Chemistry.
A.B., Princeton, 1938; Ph.D., California. 1942.

RAY MERVYN NORTHAM (1966)
Professor of Geography.
B.S., Oregon State, 1953, M.S., 1954; Ph.D., Northwestern, 1960.

MARTIN ELLIS NORTHCRAFT (1955)
Associate Professor of Civil Engineering.
B.S., Oregon State, 1955.

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Instructor in French, Modern Languages.
B.A., Northern Colorado, 1960; M.A., Colorado, 1966.

RAYMOND E. NOVOTNY (1952)
Malheur County Extension Chairman (Professor).
B.S., Wyoming, 1946; M.A., Oregon State, 1970.

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Instructor in Agricultural Education.
B.S., Oregon State, 1968, M.S., 1973.

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Assistant Professor of Military Science; Captain, U.S. Army.
B.S., North Carolina A & T, 1965; M.A., Oregon State, 1972.

FRITZ OBERHETTINGER (1958)
Professor of Mathematics.
Staatsexamen, Breslau, 1936; Ph.D., Berlin, 1942; Ph.D., (habil), Mainz, 1945.

ROBERT F. OBERMIRE (1968)
Instructor in Botany.
B.S., Portland State, 1963.

LYLE EDWARD OCHS (1969)
Research Associate, Computer Center.
B.S., Washington, 1966; M.S., Oregon, 1967.

JAMES J. O'CONNOR (1970)
Assistant Professor of Social Sciences and Social Science Education.
B.A., Loras College, 1958; M.A., Mt. St. Marys, 1963; Ed.D., University of the Pacific, 1970.

JOHN ALAN O'CONNOR (1949)
Professor of Music and Music Education.
B.S., Idaho, 1939, M.S., 1948.

NELLIE JOAN OEHLER (1965)
Linn County Extension Agent, 4-H and Youth, (Assistant Professor).
B.S., Oregon State, 1964.

LOUIS MILTON OESTER (1955)
Training Coordinator, Extenson Service (Professor).
B.S., Oregon State, 1949, Ed.M., 1952; Ed.D., North Carolina State, 1973.

JAMES EDMUND OLDFIELD (1949)
Professor of Animal Nutrition; Head of Department of Animal Science.
B.S.A., British Columbia, 1941, M.S.A., 1949; Ph.D., Oregon State, 1951. On sabbatical winter-spring 1974.

JOHN ELMER O'LEARY (1949)
Professor of Forest Engineering.
B.S.F., Michigan, 1942; M.F., Oregon State, 1947.

KEITH FLOYD OLES (1961)
Professor of Geology.
B.S., Washington, 1943, M.S., 1951, Ph.D., 1956.

ALFRED WEAVER OLIVER (1919)
Associate Professor Emeritus of Animal Science.
B.S., Oregon State, 1918; M.S., Wisconsin, 1928.

ROGER DEAN OLLEMAN (1959)
Professor of Metallurgical Engineering.
B.S. (Mech. Engr.), Washington, 1948; M.S. (Met.E.), Carnegie Tech, 1950; Ph.D., Pittsburgh, 1955.

GUHLI JOHANNA OLSON (1959)
Associate Professor, Prenursing.
B.S., Battle Creek, 1936; R.N., Ohio, 1936; M.S., Western Reserve, 1947.

PHILLIP DAVID OLSON (1966)
Instructor in Agronomic Crop Science.
B.S., Idaho, 1963; M.S., Oregon State, 1971.

ROBERT ELDON OLSON (1968)
Research Associate in Zoology.
B.A., Concordia College, 1962; M.S., Montana State, 1964, Ph.D., 1968.

PAUL WILSON OMAN (1967)
Professor of Entomology.
B.A., Kansas, 1930, M.A., 1935; Ph.D., George Washington University, 1941.

JOHN PHILIP O'NEILL (1966)
Professor and Head of Family Life.
B.S., Oregon State, 1959, M.S., 1961; Ph.D., Florida State, 1963.

PRESTON EUGENE ONSTAD (1956)
Assistant Professor of English.
B.A., University of Puget Sound, 1942, M.A., 1947.

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Associate Professor of Electrical and Computer Engineering.
B.S., Oregon State, 1934, M.S., 1939.

DANIEL THOMAS ORDEMAN (1927)
Registrar, Professor Emeritus of English.
A.B., Washington and Lee, 1920, M.A., 1922; Ph.D., Maryland, 1927.

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Assistant Professor Emeritus of Office Administration.
B.S., Oregon State, 1922, M.S., 1940.

MIRIAM W. ORZECH (1965)
Academic Coordinator, Educational Opportunities (Instructor).
B.A., California (Berkeley), 1953; M.A., Oregon State, 1969.

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Associate Professor of Economics.
B.S., California (Berkeley), 1950.

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B.S. (Lib.Sc.), Washington, 1928; M.A., Oregon State, 1939.

OWEN DALE OSBORNE (1971)
Assistant Professor of Electrical and Computer Engineering.
B.S., Missouri, 1966; M.S., Oklahoma State, 1967, Ph.D., 1972.

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Associate Professor of Physical Education.
B.A., Michigan State, 1960, M.A., 1962; Ed.D., Utah, 1970.

VICKI JEAN OSIS (1971)
Extension Marine Science Education Specialist (Instructor).
B.S., Southwest Missouri State, 1965; M.A., Missouri, 1968.

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Research Associate in Physics.
B.S., Stanford, 1968; M.S., Chicago, 1969.

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ALAN DENIG OTNESS (1971)
Marine Extension Agent (Instructor).
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B.S., Oregon State, 1950, M.F., 1968.

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B.A., California (at Los Angeles), 1936; M.A., Redlands, 1940.

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Professor of Statistics and Forest Management.
B.S., Virginia Polytechnic Institute, 1948, M.S., 1950; Ph.D., North Carolina State, 1964.

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A.A., Phoenix College, 1948; B.A., San Diego State, 1950; M.A., Arizona State, 1952; Ph.D., Arizona, 1964.

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Associate Professor of Agricultural Engineering.
B.S.A., Wisconsin, 1940; B.S., (M.E.), Purdue, 1942, M.S. (M.E.), 1949.

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B.S.C., Iowa, 1950, M.A., 1954.

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HASONG PAK (1969)
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B.S. (Agr. Engr.), Missouri, 1937; M.S. (Agr. Engr.), Minnesota, 1940.

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B.S., Pusan Fisheries College, 1953; M.S., Texas A&M, 1957, Ph.D., 1961.

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B.S.F., Oregon State, 1933.

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Extension Community Development Specialist (Assistant Professor).
B.A., Western Washington State College, 1959.

JAMES ROLAND PARKER (1926)
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B.S., Oregon State, 1922, M.S., 1924.

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B.A., Brandeis, 1958; M.A.T., Harvard, 1960, Ed.D., 1968.

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Professor of Poultry Science.
B.S., Tennessee, 1934; A.M., Missouri, 1936, Ph.D., 1940.

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Instructor in Institution Management, Assistant Director Residence Food Service.
B.S., Wisconsin, 1965; M.S., Oregon State, 1972.

FRANK LOVERN PARKS (1949)
Professor Emeritus of Sociology.
B.A., B.E., Colorado, 1929, M.A., 1931; Ph.D., Washington, 1949.

LEO W. PARKS (1958)
Professor of Microbiology.
B.S., Illinois, 1952; A.M., Indiana, 1953; Ph.D., Washington, 1956.

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B.S., West Virginia, 1957; M.S., Maryland, 1962.

THERAN DUANE PARSONS (1955)
Professor of Chemistry; Associate Dean, College of Science.
B.S., Washington, 1949, Ph.D., 1953.

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Assistant Professor of Business Administration.
S.B., University of Chicago. 1962, M.B.A., 1964; D.B.A., Indiana, 1970.

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Professor Emeritus of Clothing, Textiles, and Related Arts.
B.Arch., Oregon, 1931; M.F.A., Cranbrook Academy of Art, 1950.

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Instructor in Journalism.
B.A., South Dakota, 1954; M.A., Oregon State, 1973.

KENNETH DENTON PATTERSON (1958)
Professor of Economics.
B.S., Iowa State, 1951; M.A., Nebraska, 1956, Ph.D., 1961.

PRESTON STUART PATTIE (1970)
Area Extension Agent (Instructor).
B.S., Oregon State, 1966. On leave Sept. 1973-Sept. 1975.

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Director, Laboratory Animal Resources, Veterinary Medicine (Associate Professor).
B.S., Utah State, 1958; D.V.M., California at Davis, 1962; Ph.D., Missouri, 1972.

WILLIAM HOWARD PAUL (1926)
Professor Emeritus of Mechanical Engineering.
B.S., Oregon State, 1924, M.S., 1934.

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B.S., South Dakota State, 1956.

CLAYTON A. PAULSON (1971)
Assistant Professor of Oceanography.
B.A., Augsburg College, 1960; Ph.D., Washington, 1967.

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Research Associate in Food Science and Technology.
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WILLIAM GORDON PEARCY (1960)
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Assistant Professor of Biochemistry and Biophysics.
B.S., Stanford, 1964, Ph.D., 1969.

MARGOT NOALL PEARSON (1971)
Research Associate in Agricultural Chemistry.
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JAMES ROBERT PEASE (1973)
Associate Professor of Geography; Extension Land Resource Management Specialist.
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Social Sciences and Humanities Librarian (Assistant Professor).
B.A., Linfield College, 1967; M.L.S., California, 1968.

CHARLES WESLEY PECKHAM (1965)
Director of Department of Printing (Assistant Professor).
B.S., California State Polytechnic, 1958.

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Director, Special Programs; Assistant to the Dean of Students; Assistant Professor of Education.
B.A., Colorado State, 1967, M.S., 1968; Ph.D., Oregon State, 1972.

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Associate Professor of Electrical and Computer Engineering (Courtesy).
B.S., University of Pittsburgh, 1950, M.S.E.E., 1958.

TIMOTHY PETER PERKINS (1973)
Instructor in English.
B.A., Oregon State, 1971, M.A., Western Washington State, 1973.

GENE G. PERRY (1974)
Instructor in Business Administration.
B.S., Nevada, 1966, M.B.A., 1970.

WILLIAM McGUIRE PERRY (1945)
Yamhill County Extension Agent, 4-H Club (Assistant Professor Emeritus).
B.S., Oregon State, 1922.

JEAN McLEOD PETERS (1958)
Associate Professor of Foods and Nutrition.
B.H.E., University of British Columbia, 1950; M.S., Oregon State, 1964.

BENT EDVARD PETERSEN (1968)
Associate Professor of Mathematics.
B.S., University of British Columbia, 1964; Ph.D., M.I.T., 1968.

RAY OLAF PETERSEN (1953)
Klamath County Extension Agent (Professor Emeritus).
B.S., Idaho, 1935; M.S., Oregon State, 1962.

ROGER GENE PETERSEN (1955, 1965)
Professor of Statistics.
B.S., Iowa State, 1949, M.S., 1950; Ph.D., North Carolina State, 1954.

ERNEST W. PETERSON (1969)
Assistant Professur of Atmospheric Sciences.
B.A., UCLA, 1962; Ph.D., Penn State, 1969.

JOHN PETERSON (1964)
Associate Professor of Civil Engineering.
B.S., South Dakota State, 1951; M.S., Illinois, 1959; Ph.D., Wisconsin, 1964.

KERMIT JOSEPH PETERSON (1959)
Professor of Veterinary Medicine.
B.S., Minnesota, 1940; D.V.M., Colorado State, 1946.

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Instructor in Civil Engineering.
B.S., Oregon State, 1967, M.S., 1967.

RICHARD V. PETERSON (1973)
Financial Aid Counselor (Instructor).
B.S., Oregon College of Education, 1971; M.S., Oregon, 1972.

LARRY L. PETRY (1972)
Instructor in Education.
B.A., Western Washington State, 1967, M.Ed., 1970.

FLORENCE ELOISE PETZEL (1954-61, 1967)
Professor and Head of Clothing, Textiles, and Related Arts.
Ph.B., Chicago, 1931, A.M., 1934; Ph.D., Minnesota, 1954.

JOHN ADAMS PFANNER, JR. (1946)
Professor Emeritus of Business Administration.
A.B., Dartmouth, 1927; M.A., Chicago, 1931, Ph.D., 1939.

DAVID WALTON PHELPS (1965)
Associate Professor of Health.
B.S., Oregon College of Education, 1956; M.S., Oregon, 1959; M.P.H., California, 1962, Ed.D., 1964.

ROBERT ELTON PHELPS (1968)
Associate Professor of Civil Engineering.
B.S., Alaska, 1957; M.S., Stanford, 1958.

KURT DAVID PHILIPP (1963)
Associate Professor of History.
B.A., California at Los Angeles, 1956; M.A., Colorado, 1958; Ph.D., Kansas, 1969.

DONALD CHARLES PHILLIPS (1961)
Professor of Civil Engineering.
B.S., Washington State, 1944; M.S., Louisiana State, 1958; Ph.D., Wisconsin, 1963.

MARYANN KATHERINE PHILLIPS (1967)
Manager of Memorial Union Craftshop (Instructor).
B.A., Miami University, 1952; M.Ed., Oregon State, 1967.

MARYELLEN PHILLIPS (1973)
Instructor in Business Administration.
B.A., Washington, 1956; M.B.A., Oregon State, 1973; CPA, Washington, 1958, Oregon, 1973.

PATRICIA ANN PHILLIPS (1973)
Union County Extension Agent (Instructor).
A.A., Treasure Valley Comm. Coll., 1968; B.S., Oregon State, 1972.

RALPH LEON PHILLIPS (1973)
Assistant Professor of Animal Science.
B.S., Utah State, 1964, M.S., 1966; Ph.D., Oregon State, 1973.

ROBERT LEE PHILLIPS (1957)
Professor of Journalism; Director of Summer Term; Assistant to the President for Continuing Educational Services; Assistant to the President.
A.B., Miami (Ohio), 1952; M.S., Illinois, 1954; Ph.D., Oregon, 1966.

HARRY KENYON PHINNEY (1947)
Professor of Botany.
B.A., Cincinnati, 1941; M.A., Albion, 1943; Ph.D., Northwestern, 1945.

WANDA LEE PHIPPS (1951-52, 54-56, 1971)
County Extension Agent (Instructor).
B.S., Linfield, 1949.

EDWARD HARMAN PIEPMEIER (1966)
Associate Professor of Chemistry.
B.S., Northwestern, 1960; Ph.D., Illinois, 1966.

DONALD ALAN PIERCE (1966)
Associate Professor of Statistics.
B.S., Oklahoma State, 1961, M.S., 1962, Ph.D., 1965.

K. STEPHEN PILCHER (1951)
Professor of Microbiology.
B.S., Washington, 1933, Ph.D., 1939.

RONALD DALE PILLSBURY (1967)
Research Associate in Oceanography.
B.A., Chico State, 1961; M.A., California at Davis, 1964; Ph.D., Oregon State, 1972.

BERNARD JAY PITTS (1971)
Assistant Director of Educational Activities and Physical Recreation (Instructor).
B.S., Southern Illinois, 1971.

HANS HEINRICH PLAMBECK (1946)
Professor and Chairman of Sociology.
B.A., Oregon, 1935, M.A., 1938; Ph.D., Cornell, 1941.

CONSTANCE PATRICIA PLANTS (1960-66, 1967)
Coordinator of Home Economics Learning Resource Center (Senior Instructor).
B.S., Oregon State, 1947.

MARTHA AMANDA PLONK (1952)
Associate Professor of Home Management.
B.S., Women's College of University of North Carolina, 1940; M.S., Ohio State, 1949; Ph.D., Michigan State, 1964.

DONALD L. PLUCKNETT (1966)
Associate Professor of Agronomic Crop Science (Courtesy).
B.S., Nebraska, 1953, M.S., 1957; Ph.D., Hawaii, 1961.

ANTON POLENSEK (1965)
Assistant Professor of Forest Products (Structural Engineer).
Dipl. in Civil Engineering, University of Ljubljana, Yugoslavia, 1962; M.S., Oregon State, 1969; Ph.D., 1972.

HELEN M. POLENSEK (1969)
Visiting Instructor in German, Modern Languages.
B.A., Hougton College, 1960; M.A., Michigan, 1963.

DAN WILLIAMS POLING (1937)
Dean of Men Emeritus (Professor Emeritus).
B.S., Oregon State, 1928, M.S., 1938; D.Ed., Oregon, 1956.

DOW P. POLING (1963)
Associate Professor of Physical Education; Director of Intramural Sports, Recreational Activities.
B.S., Oregon State, 1956, Ed.M., 1963; Ph.D., Illinois, 1972.

HELEN VIRGINIA POLING (1956)
Senior Instructor Emeritus in Physical Education.
B.S., Oregon State, 1956.

PEGGY J. POLING (1965)
Instructor in Speech Communication.
B.S., Oregon, 1956; M.A., Oklahoma, 1963.

ALBERT ROBERTS POOLE (1946)
Professor of Mathematics.
B.A., British Columbia, 1929, M.A., 1931; Ph.D., California Institute of Technology, 1935.

MILOSH POPOVICH (1945, 1947)
Dean of Administration; Professor of Mechanical Engineering.
B.S., Oregon State, 1939, M.S., 1941.

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Research Associate, Computer Center.
B.S., Texas, 1962; M.A., University of Houston, 1966; Ph.D., Oregon, 1972.

WILMER H. POST (1966)
Assistant to the President; Assistant Professor of Business Administration.
B.S., Oregon State, 1960; M.B.A., California (Berkeley), 1961.

ERMINE LAWRENCE POTTER (1908)
Professor Emeritus of Agricultural Economics.
B.S., Montana State, 1906; B.S.A., Iowa State, 1908, M.S., 1920.

RICHARD WENDELL POTTER (1959)
Producer-Director, KOAC-TV; Assistant Professor, Oregon Educational and Public Broadcasting Service.
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WILLARD CHARLES POTTS (1959)
Associate Professor of English.
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Associate Professor of Plant Pathology.
B.S., Utah State, 1951, M.S., 1956; Ph.D., Oregon State, 1959.

WILBUR LOUIS POWERS (1909)
Professor Emeritus of Soils.
B.S., New Mexico State, 1908, M.S., 1909; Ph.D., California, 1926.

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Polk County Extension Chairman. (Associate Professor).
B.S., Oregon State, 1945, M.S., 1970.

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Professor Emeritus of Child Development.
B.S., Oregon State, 1917; M.A., California, 1929.

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B.S., Kansas State Teachers College, 1927.

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Dean (Professor) Emeritus, School of Agriculture; Director Emeritus, Agricultural Experiment Station; Director Emeritus, Federal Cooperative Extension.
B.S., Oregon State, 1922.

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Assistant Professor of Pharmaceutical Science.
B.S., Washington, 1966; M.S., Iowa, 1969.

AUSTIN WYATT PRITCHARD (1953)
Professor of Zoology.
A.B., Stanford, 1948, M.A., 1949; Ph.D., Hawaii, 1953.

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Professor of Civil Engineering.
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B.S., California at Davis, 1963, M.S., 1964; Ph.D., Oregon State, 1972.

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Professor of Animal Nutrition, Superintendent, Squaw Butte Experiment Station.
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FRED LAWRENCE RAMSEY (1966)
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DONALD LEWIS RASMUSSEN (1946)
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PAUL MEREDITH RAUEN (1959)
Yamhill County Extension Agent, 4-H and Youth, (Associate Professor).
A.A., Minnesota, 1949; B.S., South Dakota State, 1958; M.S. (Education), Portland State, 1969.

CECIL OTIS RAWLINGS (1946)
Extension Horticulture Specialist (Associate Professor). (Retired.)
B.S., Illinois, 1925; M.S., New Hampshire, 1946. Retired.

PAUL DANIEL READ, AIA (1954)
Assistant Professor of Architecture.
B.S. in Arch., University of Cincinnati, 1953; Architect, 1957.

JAMES O. REAGAN (1973)
Assistant Professor of Animal Science.
B.S., Texas A & M, 1968, M.S., 1970.

ALICE LOIS REDMAN (1959)
Extension Specialist, 4-H and Youth (Professor).
B.S., Missouri, 1953; M.S., Maryland, 1959.

RICHARD GEORGE REDMOND (1964)
Senior Instructor in Oceanography.
B.S., Kent State, 1940.

DAVID J. REED (1972)
Assistant Professor of Resource Recreation Management.
B.S., Texas Tech, 1964; M.S., Michigan State, 1966; Ph.D., Texas A&M, 1972.

DONALD JAMES REED (1962)
Professor of Biochemistry.
B.S., College of Idaho, 1953; M.S., Oregon State, 1955, Ph.D., 1957.

CLINTON B. REEDER (1966)
Extension Marketing Management Specialist; Assistant Professor of Agricultural Economics.
B.S., Oregon State, 1961, M.S., 1963; Ph.D., Purdue, 1966. On leave 1973-74.

HAMIT DARWIN REESE (1947)
Professor of Chemistry.
B.A., Brigham Young, 1940; Ph.D., Iowa State, 1947.

CHARLES CALHOUN REGER (1964)
Professor; Assistant Physician Student Health Service.
B.A., Colorado, 1939, M.D., 1942.

ROBERT RAY REICHART (1926-32, 1934)
Professor of Forestry Education.
B.S., Oregon State, 1917, M.S., 1937; D.Ed., Oregon, 1941.

JOE CARLTON REINERT (1971)
Research Associate in Agricultural Chemistry.
B.S., Lehigh, 1967; Ph.D., Brown, 1971.

GORDON M. REISTAD (1970)
Assistant Professor of Mechanical and Nuclear Engineering.
B.S., Montana State, 1966; M.S., Wisconsin, 1967, Ph.D., 1970.

WILLIAM CHARLES RENFRO (1967)
Assistant Professor of Oceanography.
B.A., Texas, 1951, M.A., 1958; Ph.D., Oregon State, 1967.
On leave through June 1974.

JOHN JOSEPH RENK (1973)
Washington County Extension Agent (Instructor).
B.S., Utah State, 1968; M.S., Idaho, 1973.

HELMUTH RESCH (1970)
Professor and Head of Forest Products.
Dipl. Engineer, Hochschule für Bodenkultur, Vienna, 1951; M.S., Utah State, 1958; Doctorate H.T.B., Vienna, 1960.

JACK LOUIS RETTIG (1961)
Professor of Business Administration.
B.S., Evansville College, 1949; M.A., San Diego State College, 1956; Ph.D., UCLA, 1962.

RAYMOND BRUCE RETTIG (1968)
Associate Professor of Agricultural Economics.
B.A., Montana, 1962; M.A., Northwestern, 1964; Ph.D., Washington, 1969.

GUY ELMER REYNOLDS (1966)
Extension Animal Health Specialist (Associate Professor).
B.S., Washington State, 1950, D.V.M., 1950.

JAMES FRANK RICE (1973)
Associate Professor of Naval Science.
B.S., Oregon State, 1956.

DARYL GARNET RICHARDSON (1973)
Assistant Professor of Horticulture.
B.S., Minnesota, 1969, M.S., 1971, Ph.D., 1973.

GEORGE ARTHUR RICHARDSON (1947)
Professor Emeritus of Food Science and Technology and of Dairy Chemistry.
B.Sc. (Agr.), Toronto, 1920; M.S., Minnesota, 1925. Ph.D., 1927.

SALLY L. RICHARDSON (1971)
Research Associate in Oceanography.
B.S., Wilkes College, 1966; Ph.D., William and Mary, 1972.

ANTON STUART RICHERT (1969)
Associate Professor of Physics.
B.S., Cal Tech, 1957; Ph.D., Cornell, 1962.

LOUIS EARL RICHTER (1953)
Professor of French, Modern Languages.
B.A.. Minnesota, 1940: M.A.. Oregon, 1947.
On leave of absence 1970-74.

RONALD WAYNE RICKMAN (1970)
Research Soil Scientist (Courtesy Assistant Professor).
B.S., Washington State, 1963; Ph.D., California at Riverside, 1966.

FRED R. RICKSON (1971)
Associate Professor of Botany and Plant Pathology.
A.A., Pierce Junior College, 1959; B.A., San Fernando State, 1961; M.A., Miami (Ohio), 1963; Ph.D., California at Berkeley, 1966.

JAMES W. RIDLINGTON (1971)
Research Associate in Agricultural Chemistry.
B.S., Washington State, 1966; Ph.D., Purdue, 1971.

SANDRA LEE RIDLINGTON (1973)
Instructor in English.
B.A., Washington State, 1966, M.A., Purdue, 1969.

EDWARD ERNEST RIESLAND (1957)
Associate Professor of Mechanical Engineering.
B.S. in M.E., Oregon State, 1957, M.S., 1960.

JAMES LEAR RIGGS (1958)
Professor and Head of Industrial and General Engineering.
B.S., Oregon State, 1951; M.S., 1958, Ph.D., 1963.

JACK ETTER RILEY (1972)
Head Baseball Coach, Intercollegiate Athletics (Assistant Professor).
B.A., Linfield, 1960; M.A., Oregon State, 1971.

JOHN CLAYTON RINGLE (1966)
Associate Professor of Nuclear Engineering.
B.S., Case Institute of Technology, 1957, M.S., 1959; Ph.D., California, 1964.

RAYMOND EDWARD RINK (1972)
Associate Professor of Electrical and Computer Engineering.
B.S., MIT, 1962; M.S., New Mexico, 1964, Ph.D., 1967.

JOHN W. RIPLEY (1972)
Assistant Professor of Naval Science.
B.S., U.S. Naval Academy, 1962.

PAUL OSBORN RITCHER (1952)
Professor of Entomology.
A.B., Illinois, 1931, A.M., 1932; Ph.D., Wisconsin, 1935.

ELLIS BROOKS RITTENHOUSE (1964)
Associate Professor of Oceanography; Marine Superintendent.
B.S., United States Naval Academy, 1934; M.B.A., Ohio State, 1952.

LARRY RONALD RITTENHOUSE (1969)
Assistant Professor of Rangeland Resources, Squaw Butte Experiment Station.
B.S., Utah State, 1962; M.S., Nebraska, 1966, Ph.D., 1969.

WILLIAM GROVER ROBBINS (1971)
Assistant Professor of History.
B.S., Western Connecticut State, 1962; M.A., Oregon, 1965, Ph.D., 1969.

ALFRED NATHAN ROBERTS (1940)
Professor of Horticulture.
B.S., Oregon State, 1939, M.S., 1941; Ph.D., Michigan State, 1953.

DONALD D. ROBERTS (1970)
Agronomist, Agronomic Crop Science (Courtesy Instructor); USDA.
B.S., Ft. Lewis College, 1965, M.S., Washington State, 1971.

PAUL ALFRED ROBERTS (1966)
Professor of Zoology.
B.S., Illinois, 1953, M.D., 1957; Ph.D., Chicago, 1962.

RADCLYFFE BURNAND ROBERTS (1968)
Research Associate in Entomology (Courtesy).
A.B., Cornell, 1961, M.A., 1965; Ph.D., Kansas, 1968.

THOMAS EDWARD ROBERTS (1948)
Professor of Music.
B.A., Iowa Wesleyan, 1942; M.M., Chicago Musical College, 1949.

WARREN WAYNE ROBERTS (1950-52, 1954)
Yamhill County Extension Agent (Professor).
B.S., Oregon State, 1950, M.Agr., 1970.

CAL JEAN ROBERTSON (1973)
County Extension Agent (Instructor).
B.S., Alcorn A&M, 1973.

WILLIAM BARR ROBERTSON (1946)
Athletic Trainer (Assistant Professor), Intercollegiate Athletics.
B.S., Oregon State, 1948.

WILLIAM JAMES ROBERTSON (1965)
Associate Professor of Speech Communication.
B.F.A., School of Drama, Art Institute of Chicago, 1949, M.F.A., 1951; Ph.D., Wisconsin, 1963.

ALAN HADLEY ROBINSON (1966)
Associate Professor of Nuclear Engineering.
B.S., Swarthmore College, 1956; M.S., Stanford, 1961, Ph.D., 1965.

DAN D. ROBINSON (1944)
Professor of Forest Management.
B.S., Oregon State, 1940; M. F., Syracuse, 1942.

JOHN H. ROBINSON (1973)
Assistant Professor of Veterinary Medicine.
B.A., Washington State, 1965, D.V.M., 1968, M.S., 1971; Ph.D., Wisconsin, 1973.

ROBERT RAY ROBINSON (1971)
Extension Entomologist (Assistant Professor).
B.S., Arizona, 1964; M.S., Kansas State, 1969; Ph.D., Oklahoma State, 1971.

JOHN HENRY ROCK (1958)
Professor of Art.
B.S.Ed. (Ind. Arts), Oregon State, 1951; M.F.A. (Graphic Art), California College of Arts and Crafts, 1957.

H. A. RODENHISER (1970)
Professor of Plant Breeding (Courtesy), Agronomic Crop Science Retired.
B.S., New Hampshire, 1923; M.S., Minnesota, 1925, Ph.D., 1928.

JEFFERSON BELTON RODGERS (1946)
Professor Emeritus of Agricultural Engineering.
B.S., Idaho, 1929, M.S., 1935, A.E., 1939.

CHARLES RAYMOND ROHDE (1952)
Professor of Agronomy, Superintendent, Pendleton Experiment Station.
B.S., Montana State, 1947; Ph.D., Minnesota, 1953.

KERMIT JULIUS ROHDE (1956)
Professor of Psychology.
B.S., Iowa State, 1943; M.A., Nebraska, 1949; Ph.D., Northwestern, 1951.

CLAUDIA ANN RONALDSON (1971)
Assistant Professor of Art.
B.F.A., Art Institute of Chicago, 1968, M.F.A., 1971.

JON RICHARD ROOT (1969)
Production Manager of Classroom TV (Assistant Professor).
B.A., Kansas State, 1966; M.S., Oregon, 1972.

GEORGE DAVID ROSE (1967)
Assistant to Director, Research Associate, Computer Center.
B.A., Bard College, 1963; M.S., Oregon State, 1971.

ROBERT GEORGE ROSENSTIEL (1946)
Associate Professor of Entomology.
B.S., Oregon State, 1937, M.S., 1939; Ph.D., California, 1950.

CHARLES ROBERT ROSS (1946)
Extension Forestry Specialist (Associate Professor Emeritus).
B.S.F., Georgia, 1931; M.S.F., Washington, 1932.

JACKSON ROSS (1951)
Assistant Director, Extension Service (Professor).
B.S., Oregon State, 1951; M.S., Wisconsin, 1960.

RICHARD E. ROSS (1970)
Assistant Professor of Anthropology.
B.A., University of Colorado, 1959; M.A., Oregon, 1963; Ph.D., Washington State, 1971.

PETER GEORG ROSSBACHER (1968)
Professor of Russian, Modern Languages.
Ph.D., University of Kiel, 1959.

CHARLES W. ROTH (1973)
Instructor in Microbiology.
B.S., Purdue, 1964; M.S., Illinois, 1966, Ph.D., 1969.

LEWIS FRANKLIN ROTH (1940)
Professor of Botany.
B.A., Miami (Ohio), 1936; Ph.D., Wisconsin, 1940.

JACK STEVENS ROTHACHER (1961)
Associate Professor of Forest Management (Courtesy), Research Forester, Forestry Sciences Laboratory, U.S. Forest Service.
B.S.F., Michigan, 1939; M.F., California, 1947.

KENNETH EUGENE ROWE (1964)
Associate Professor of Statistics.
B.S., Colorado State University, 1957; M.S., North Carolina State, 1960; Ph.D., Iowa State, 1966.

HAROLD ARMOND ROWLEY (1938)
Chief Accountant, Oregon State System of Higher Education (Professor).
B.S., Oregon State, 1925.
Retired.

MARVIN LAVERN ROWLEY (1973)
Forest Properties Manager, Forest Engineering (Instructor).
B.S., Oregon State, 1950.

DORRIS MARY ROY (1952)
Clatsop County Extension Agent, Home Economics (Associate Professor Emeritus).
B.S., Oregon State, 1934; M.S., Wisconsin, 1962.

ORIS CLARK RUDD (1955)
Jefferson County Extension Chairman (Professor).
B.S., Utah State, 1951, M.S., 1963.

JULIUS ALEXANDER RUDINSKY (1955)
Professor of Forest Entomology.
Diplom Engineer in Forestry, Slovak University in Bratislava, 1944; Absolutorium in Economics, Göttingen, 1949; Ph.D., Ohio State, 1953.

NORMA LEIGH RUDINSKY (1965-68, Fall 1972, 1973)
Instructor in English.
A.B., Stanford, 1950, A.M., 1953.

DORA L. RUMSEY (1972)
Curry County Extension Agent (Instructor).
B.S., Kansas State College, 1968.

ROBERT HARVEY RUTH (1954)
Associate Professor of Forest Management (Courtesy), Principal Silviculturist, Forestry Sciences Laboratory, U.S. Forest Service.
B.S., Oregon State, 1943, M.F., 1950. Ph.D., 1967.

PAUL MELTON RUTLAND (1952)
Instructor in Animal Science (Horsemanship).

ROGER BAKER RYAN (1961)
Assistant Professor of Entomology (Courtesy); Principal Entomologist, U. S. Forest Service.
B.S., New York State College of Forestry, 1953; M.S., Oregon State, 1959, Ph.D., 1961.

DONALD J. RYDRYCH (1965)
Associate Professor of Agronomy, Pendleton Experiment Station.
B.S., Idaho, 1953, M.S., 1958.

MARLYN C. RYUM (1967)
Producer-Announcer KOAC Radio, Senior Instructor, Oregon Educational and Public Broadcasting Service.
B.S., Linfield, 1962.

HARVEY SACHS (1972)
Research Associate in Oceanography.
B.A., Rice, 1967; Ph.D., Brown, 1973.

AZALEA LINFIELD SAGER (1932)
State Leader Home Economics Extension. (Professor Emeritus).
B.S., Montana State, 1919; M.A., Columbia, 1921.

ROBERT W. SAGER (1961)
Professor and Head of Pharmaceutical Science.
B.S., Washington, 1944, M.S., 1945, Ph.D., 1949.

RALPH WILLIAM SALISBURY (1949)
Extension Publications Specialist (Associate Professor).
B.S., Kansas State, 1949.

ROBERT HILL SALZER (1973)
Wallowa County Extension Agent (Instructor).
B.A., Arizona, 1966; Ed.M., Oregon State, 1971.

GARY H. SANDER (1955)
Extension Forestry Specialist (Assistant Professor).
B.S., Missouri, 1951.

RAYMOND S. SANDERS (1967)
Chief Clinical Psychologist, Student Health Service; Associate Professor of Psychology.
A.A., Shasta College, 1958; A.B., Chico State, 1960; M.A., Michigan State, 1965, Ph.D., 1967.

DONALD R. SANDERSON (1968)
Director of Education Activities and Physical Recreation (Assistant Professor).
B.S., Ohio Northern University, 1958; M.Ed., Bowling Green State University, 1965; M.A., Toledo University, 1966; Ed.D., Oregon State, 1971.

ERNEST NELSON SANDGREN (1948)
Professor of Art.
B.A., Oregon, 1943, M.F.A., 1948.

WILLIAM EWALD SANDINE (1958)
Professor of Microbiology.
B.S., Iowa State, 1950; M.S., North Carolina State, 1955: Ph.D., Oregon State, 1958. On leave 1974-75.

HARRY RUDOLPH SANDQUIST (1945)
Malheur County Extension Chairman (Professor Emeritus).
B.S., Oregon State, 1938.

DENNIS JOSEPH SARGENT (1973)
Instructor in Business Administration.
B.S., Oregon State, 1969.

CHARLES SARTWELL, JR. (1969)
Research Associate in Entomology (Courtesy), Forestry Sciences Laboratory, U.S. Forest Service.
B.S., California, 1961; M.S., Idaho, 1966.

RICHARD VINCENT SASAKI (1973)
Instructor in Business Administration.
B.A., California at Berkeley, 1966; M.S., Stanford, 1968.

CAROL ANN SASLOW (1969)
Associate Professor of Psychology.
B.A., California, 1964; Ph.D., Washington, 1969.

JOHN LOUIS SAUGEN (1964)
Associate Professor of Electrical and Computer Engineering.
B.S.E.E., Washington, 1955, M.S.E.E., 1958, Ph.D., 1964.

MOLLY SYLVESTER SAUL (1962)
Extension Agent, Home Economics, Umatilla-Morrow Counties (Professor).
B.S., Washington, 1941, B.S. in Home Economics, 1942; M.S., Cornell, 1953.

LAVELL E. SAUNDERS (1969)
Assistant Professor of Sociology.
B.S., Utah State, 1962, M.S., 1964; Ph.D., Minnesota, 1969.

ROY BLY SAUNDERS (1946)
Associate Professor of Mathematics.
A.B., Whitman, 1933; M.A., Minnesota, 1940, Ph.D., 1946.

GLENN DICKINSON SAVELLE (1973)
Assistant Professor of Rangeland Resources.
B.S., University of California (Berkeley), 1964; M.S., 1966.

JAMES WINSTON SAWYER (1970)
Assistant Professor of Speech Communication.
A.B., Bates College, 1956; M.S., Syracuse, 1957.

REBECCA CHRISTINE SAWYER (1972)
Jefferson County Extension Agent (Instructor).
B.S., Oregon State, 1972.

WILLIAM ARTHUR SAWYER (1934)
Professor Emeritus of Animal and Range Science.
B.S., Oregon State, 1931.

MURLE SCALES (1947)
Assistant State Leader, Extension Home Economics (Professor Emeritus).
B.S., Trinity (Texas), 1932; M.S., Iowa State, 1947.

RICHARD ANTHONY SCANLAN (1964)
Associate Professor of Food Sciences and Technology.
B.S., Cornell, 1960, M.S., 1962; Ph.D., Oregon State, 1968.

DAVID WALDRON SCHACHT (1967)
Assistant Professor, Library.
B.A., Carleton College, 1940; M.S., Oklahoma, 1947; M.A., University of Denver, 1964.

B'LOU SCHAEFER (1968)
Assistant Professor of Physical Education.
B.S., Wisconsin, 1959, M.S., 1966.

W.H.C. SCHALLIG (1955)
Assistant Professor Emeritus of Range Ecology.
B.A., California, 1922.

PHILIP B. SCHARY (1966)
Associate Professor of Business Administration.
B.S., St. Louis University, 1951; M.B.A., California (Berkeley), 1955; Ph.D., UCLA, 1966.

FRANK DAVID SCHAUMBURG (1967)
Associate Professor and Head of Civil Engineering.
B.S.C.E., Arizona State, 1961; M.S.C.E, Purdue, 1964, Ph.D., 1966.

HENRY W. SCHAUP (1973)
Assistant Professor of Biochemistry.
B.A., College of Steubenvill, 1964; Ph.D., Colorado State, 1969.

LARRY SCHECTER (1955)
Professor and Chairman of Physics.
A.B., California, 1948, M.A., 1951, Ph.D., 1953.

JEAN WILLARD SCHEEL (1946)
Assistant Director, Extension Service (Professor Emeritus).
B.S., Kansas State, 1934; M.A., Chicago 1954.

THEODORE COMSTOCK SCHEFFER (1969)
Research Associate in Forest Products.
B.S., Washington, 1926, M.S. For., 1929; Ph.D., Wisconsin, 1935; Post Doctorate, Johns Hopkins.

WILBERT ALBERT SCHEFFLER (1974)
Associate Professor of Mechanical and Metallurgical Engineering (Courtesy).
B.S., Tulane, 1961, M.S., 1965; Ph.D., Minnesota, 1971.

KENNETH ERIC SCHESSLER (1973)
Area Head Resident, Housing (Instructor).
B.A., Eastern Montana College, 1969; M.S., Oregon State, 1973.

HENRY LYNN SCHEURMAN (1964)
Research Associate in Statistics and Computer Center.
A.A., Boise Junior College, 1957; B.S., Oregon State, 1963, M.S., 1968.

RODNEY AUGUST SCHMALL (1970)
Research Engineer National Council for Air and Stream Improvement (Courtesy Assistant Professor).
B.S., Montana State, 1968, M.S., 1970.

FRED HERMAN SCHMIDT (1962)
Entomologist United States Forest Service; Assistant Professor of Forest Entomology (Courtesy).
B.S., Illinois, 1957, M.S., 1959.

WILSON EDWARD SCHMISSEUR (1971)
Research Associate in Agricultural Economics.
B.S., Illinois, 1964; M.S., Purdue, 1966, Ph.D., 1973.

ROMAN A. SCHMITT (1966)
Professor of Chemistry.
M.S., Chicago, 1950, Ph.D., 1953.

JOHN ALBERT SCHMITZ (1972)
Associate Professor of Veterinary Medicine.
D.V.M., Colorado State, 1964; Ph.D., Missouri, 1971.

GARY LEE SCHNEIDER (1964)
Josephine County Extension Agent (Assistant Professor).
B.S., Oregon State, 1962, M.Ag., 1971.

ROBERT D. SCHONBROD (1960)
Research Associate in Entomology.
B.S., Oregon State, 1954, Ph.D., 1971.

HARRY AUGUST SCHOTH (1914)
Professor Emeritus of Agronomy.
B.S., Oregon State, 1914, M.S., 1917.

HELMUT GEORGE SCHREIMA (1959)
Professor of Business Administration.
B.A., Willamette, 1953, J.D., 1955.

ELVER AUGUST SCHROEDER (1946)
Professor of English.
A.B., Elmhurst College, 1934; M.A., Illinois, 1937; Ph.D., Michigan, 1950.

JANE FOSTER SCHROEDER (1952-59, 1960)
Deschutes County Extension Agent (Associate Professor).
B.S. in Home Economics, Kansas State, 1949.

WALTER GREIFF SCHROEDER (1949)
Curry County Extension Chairman (Professor).
B.S., Oregon State, 1949; M.S., Wisconsin, 1957.

WARREN LEE SCHROEDER (1967)
Associate Professor of Civil Engineering.
B.S.C.E., Washington State, 1962, M.S.C.E., 1963; Ph.D., Colorado, 1967.

JOHN PAUL SCHULDT (1972)
Assistant Professor of Forest Products.
B.S., Illinois, 1967; M.S., Colorado State, 1970, Ph.D., 1972.

HAROLD WILLIAM SCHULTZ (1953)
Professor of Food Science and Technology.
B.A., Colorado College, 1933; M.S., Iowa, 1935, Ph.D., 1937.

HARRY WAYNE SCHULTZ (1959)
Associate Professor of Pharmaceutical Chemistry.
B.S., Iowa, 1952, M.S., 1957, Ph.D., 1959.

ROBERT JAMES SCHULTZ (1962)
Professor of Civil Engineering.
B.S. in Civil Eng., Worcester Polytechnic Institute, 1955, M.S., 1960.

MACK WALTER SCHWAB (1959)
Producer-Director, KOAC TV; Assistant Professor, Oregon Educational and Public Broadcasting Service.
B.A., Harvard, 1931; M.A., Stanford, 1962.

J. DIANA BOOK SCHWEITZER (1972)
Instructor in Foods and Nutrition.
B.S., San Fernando Valley State College, 1968; M.HEc., Oregon State, 1972.

FRANCIS DALE SCHWINABART (1971)
Technical Sergeant, USAF; Instructor in Aerospace Studies.

KATHLEEN ANN SCOGGIN (1972)
Assistant Director of University Food Service, Residence Halls; Instructor in Institution Management.
B.S., Oregon State, 1967.

PAUL D. SCOGGIN (1971)
Manager, Memorial Union Food Service; Instructor in Institution Management.
B.A., Washington State, 1968.

JEAN MARGARET SCORGIE (1969)
Assistant Professor of Clothing, Textiles, and Related Arts.
B.S., Wisconsin, 1966; M.S., Iowa State, 1969.

ALLEN BREWSTER SCOTT (1941)
Professor of Chemistry.
B.S., Oregon State, 1937; Ph.D., Washington, 1941.

LEDA S. SCRIMSHER (1972)
Assistant Professor of Home Economics Education.
B.S., Idaho, 1962, M.S., 1967; Ph.D., Ohio State, 1972.

HERMAN AUSTIN SCULLEN (1920)
Professor Emeritus of Entomology.
B.A., Oregon, 1910, M.A., 1927; Ph.D., Iowa State, 1934.

JOHN SEADERS (1961)
Associate Professor of Civil Engineering.
B.S., Oregon State, 1959, M.S., 1963.

VELMA MAXWELL SEAT (1959)
Extension Food Marketing Specialist (Associate Professor).
B.S., Washington State, 1935; M.A., Columbia, 1966. On sabbatical winter, spring 1974.

STUART BRUCE SEATON (1950)
Professor of Business Administration.
B.S., Central State (Oklahoma). 1933; M.S., Oklahoma State, 1941.

JAMES RUSSELL SEDELL (1971)
Research Associate in Fisheries.
B.S., Willamette, 1966; Ph.D., Pittsburgh, 1971.

JUSTUS FRANDSEN SEELY (1969)
Associate Professor of Statistics.
B.S., Utah State, 1963, M.S., 1965; Ph.D., Iowa State, 1969.

EVA MARIE SEEN (1935)
Professor Emeritus of Physical Education.
B.S., Knox College, 1922; M.A., Wisconsin, 1926; Ed.D., New York, 1937.

RAMON JOHN SEIDLER (1970)
Assistant Professor of Microbiology.
B.A., San Fernando Valley State, 1964; Ph.D., California at Davis, 1968.

WAYNE KENNETH SEIM (1971)
Instructor in Fisheries.
B.S., Oregon State, 1967, M.S., 1970.

JOHN R. SELMER (1972)
Assistant Professor of Naval Science.
B.S., U.S. Naval Academy, 1967.

RONALD REID SEMONES (1970)
Instructor in Naval Science.

RONALD GEORGE SENECHAL (1973)
Research Associate in Geology.
B.S., Rensselaer Polytechnic Inst., 1961.

JEAN CARYL SEVEREIDE (1957)
Associate Professor of Education.
B.A., Grinnell, 1948; M.Ed., Oregon, 1956.

MACARIO GAJOTOS SEVILLA (1973)
Instructor in Business Administration.
B.A., Univ. of the East, 1961; M.A., Washington, 1965.

RICHARD W. SHAFER (1972)
Head Golf Coach, Intercollegiate Athletics (Associate Professor).
B.S., U.S. Naval Academy, 1940.

BARRY SHANE (1971)
Assistant Professor of Business Administration.
B.S., Northeastern, 1965, M.B.A., 1967; Ph.D., Massachusetts, 1973.

EDFRED LOREN SHANNON (1945)
Portland City Agent, Emeritus, 4-H Club (Associate Professor).
B.S., Oklahoma, 1922, M.S., 1932; Ph.D., Cornell, 1941.

ELIZABETH ELEANOR SHARP (1967)
Instructor in Pharmacy. Assistant Pharmacist, Student Health Service.
B.S., B. Pharm., Washington State, 1958.

WILLIAM THOMAS SHARP (1966)
Instructor in Pharmacy Administration.
B. of Pharm., Washington State, 1957; M.S. Phar., Wisconsin, 1964.

CLAYTON ALBERT SHAW (1950-53, 1966)
Assistant Registrar, (Assistant Professor).
B.S.S., Oregon State, 1942.

FRANCIS HARDING SHAW (1955)
Professor of History
B.A., Reed, 1948; M.A., California, 1951; Ph.D., Harvard, 1957.

JAMES NIVEN SHAW (1919-21, 1926)
Professor Emeritus of Veterinary Medicine.
B.S., Oregon State, 1915; B.S., D.V.M., Washington State, 1917.

BARBARA RAMSEY SHAW (1973)
Research Associate in Biochemistry and Biophysics.
A.B., Bryn Mawr, 1965; M.S., Washington, 1968, Ph.D., 1973.

J. RALPH SHAY (1966)
Professor of Botany, Assistant Dean of Research.
B.S., Arkansas, 1939; M.S., Wisconsin, 1941, Ph.D., 1943.

LORRAINE H. SHEARER (1970)
Assistant Professor of Physical Education.
B.S., Oklahoma, 1954; M.S., UCLA, 1963; Ph.D., USC, 1971.

MARVIN NOBEL SHEARER (1950)
Extension Irrigation Specialist, Professor of Agricultural Engineering.
B.S., Oregon State, 1948; M.S., Michigan State, 1961.

MILTON CONWELL SHEELY (1939)
Professor Emeritus of Mechanical Engineering.
B.S., Oregon State, 1939.

WILLIS ARDEN SHEETS (1959)
Assistant Professor of Horticulture, North Willamette Experiment Station.
B.S., Kansas State, 1952; M.S., Oregon State, 1967.

WILLIAM BRUCE SHEPARD (1972)
Assistant Professor of Political Science; State Government Liaison Specialist.
A.B., California at Riverside, 1969, M.A., 1970, Ph.D., 1972.

JAMES W. SHERBURNE (1938)
Professor Emeritus of Community Education.
A.B., Greenville College, 1927; M.A., Michigan, 1928; Ph.D., Ohio State, 1938.

GLORIA OLSON SHIBLEY (1965)
Linn County Extension Agent (Assistant Professor).
B.S., North Dakota State, 1957.

FRED MERLE SHIDELER (1929)
Assistant to the President; Director University Relations; Professor Emeritus of Journalism.
B.S., Kansas State, 1927; M.S., Oregon State, 1941.

ROBERT EDWIN SHIRLEY (1967)
Associate Professor of Business Administration.
B.A., Iowa, 1943; M.B.A., Harvard, 1948; Ph.D., Utah, 1965; C.P.A., Oregon, 1968.

STANLEY EDWARD SHIVELY (1968)
Associate Professor of Sociology.
B.A., University of Colorado, 1955, M.A., 1957; Ph.D., Pittsburgh, 1966.

CLARA BRINK SHOEMAKER (1970)
Research Associate in Chemistry.
Ph.D., Leiden Univ. (Netherlands), 1950.

DAVID POWELL SHOEMAKER (1970)
Professor and Chairman of Chemistry.
B.A., Reed College, 1942; Ph.D., Cal Tech, 1947.

WALTER O. SHOLD (1972)
Coordinator, Division of Continuing Education (Professor).
B.S., Eastern Oregon, 1947; M.Ed., Oregon, 1950; Ed.D., Washington State, 1961.

ROBERT ALLEN SHORT (1966)
Professor of Electrical and Computer Engineering; Chairman of Computer Science.
B.S., Oregon State, 1949, B.A., 1952; M.S., Stevens Institute of Technology, 1956; Ph.D., Stanford, 1961.

STEPHENS T. SHOU (1952)
Head, Social Sciences, Humanities and Business Division (Associate Professor), Library.
B.A., Yenching University (China), 1946; M.A. (Pol. Sci.), Washington, 1950, B.A. (Librarianship), 1952.

THEODORE HENRY SIDOR (1952)
Assistant Director, Extension Service (Professor).
B.S., Oregon State, 1950; M.S., Michigan State, 1961.

ROY RAGNAR SILEN (1954)
Professor of Forest Genetics (Courtesy), Forestry Sciences Laboratory, U. S. Forest Service.
B.S., Oregon State, 1943; M.S.F., Yale, 1948; Ph.D., Oregon State, 1960.

CLARA LOUISE SIMERVILLE (1950-51, 1955)
Associate Professor Emeritus, International Education.
A.B., Willamette, 1928; M.A., Oregon, 1930; Ed.D., Oregon State, 1953.

DALE DAVID SIMMONS (1959-1963, 1966)
Associate Professor of Psychology.
B.A., Puget Sound, 1954; M.A., Oregon, 1958, Ph.D., 1961.

RAYMOND CHARLES SIMON (1966)
Professor of Fisheries (Courtesy), Bureau Sport Fisheries and Wildlife.
B.S., Washington, 1957, M.S., 1960, Ph.D., 1964.

WILLIAM HADDOCK SIMONS (1966)
Professor of Mathematics.
B.A., University of British Columbia, 1935, M.A., 1937; Ph.D., California, 1947.

GERALD H. SIMONSON (1961)
Professor of Soil Science.
B.S., Minnesota, 1951, M.S., 1953; Ph.D., Iowa State, 1960.

JAMES ELLIOTT SIMPSON (1957)
Professor Emeritus of Psychology.
A.B., California, 1937, M.A., 1940; Ph.D., Kansas, 1957.

HARRIET KING SINNARD (1934-36, 1940-42, 1963)
Assistant Professor Emeritus of Home Management.
B.S., Iowa State, 1929; M.S., Oregon State, 1942.

HERBERT REEVES SINNARD (1929-32, 1934)
Professor Emeritus of Architecture and Agricultural Engineering.
B.S., Iowa State, 1927, M.S., 1929. Architect, 1933.

RUSSELL OTTO SINNHUBER (1939)
Professor of Food Science and Technology.
B.S., Michigan State, 1939; M.S., Oregon State, 1941.

HARRIET ELEANOR SISSON (1946)
Associate Professor of Pharmaceutical Science.
B.S., Minnesota, 1937, M.S., 1939.

GORDON RUSSELL SITTON (1955)
Director of International Education; Professor of Agricultural Economics.
B.S., Oregon State, 1940; Ph.D., Stanford, 1954.

CHRISTINE OERTEL SJOGREN (1960)
Professor of German, Modern Languages.
B.A., Mills College, 1945; Ph.D., Johns Hopkins, 1950.

FRANCIS ASBURY SKINNER (1946)
Klamath County Extension Agent, 4-H and Youth (Associate Professor Emeritus).
B.S., Oklahoma State, 1941.

WENDELL HARTMAN SLABAUGH (1953)
Associate Dean of Graduate School, Professor of Chemistry.
B.A., North Central, 1936; M.S., North Dakota State, 1938; Ph.D., Washington State, 1950.

LOUIS SLEGEL (1945)
Professor Emeritus of Mechanical Engineering.
B.S. (M.E.), Purdue, 1931, M.S. (M.E.), 1932, Ph.D., 1945.

EDWARD J. SLEZAK (1961)
Professor of Resource Recreation Management.
A.B., Michigan, 1938, M.A., 1952.

LARRY STEWART SLOTTA (1962)
Professor of Civil Engineering; Director of Ocean Engineering Programs.
B.S., Wyoming, 1956, M.S., 1959; Ph.D., Wisconsin, 1962.

ENOCH WALLACE SMALL (1971)
Research Associate in Biochemistry and Biophysics.
B.S., Cornell, 1967; Ph.D., Oregon, 1971.

LAWRENCE FREDERICK SMALL (1961)
Associate Professor of Oceanography.
A.B., Missouri, 1955; M.S., Iowa State, 1959, Ph.D., 1961.

CHARLES EDWARD SMITH (1961)
Associate Professor of Mechanical Engineering.
B.S. (M.E.), Oregon State, 1955; M.S. (M.E.), Rensselaer Polytechnic Institute, 1958; Ph.D. (Eng. Mechanics), Stanford, 1962.

CHARLES WESLEY SMITH (1927)
Assistant Director (Professor Emeritus), Extension Service.
B.S., Washington State, 1921.

CLIFFORD LOVEJOY SMITH (1931-34, 1941)
Extension Training Leader (Professor Emeritus), Extension Service.
B.S., Oregon State, 1929; M.S., Kansas State, 1930; Ph.D., Wisconsin, 1959.

COURTLAND L. SMITH (1969)
Associate Professor of Anthropology.
B.M.E., Rensselaer Polytechnic Institute, 1961; Ph.D., Arizona, 1968.

DEAN HARLEY SMITH (1956)
Professor of Veterinary Medicine.
B.S., Washington State, 1944, D.V.M., 1949; M.S., Oregon State, 1959.

DOROTHY MARQUERITE SMITH (1973)
Assistant Professor of Mathematics.
B.A., Mt. St. Mary's, L.A., 1953; M.S., Notre Dame, 1963; Ph.D., Oregon State, 1973.

EARL EUGENE SMITH (1957)
Professor of Industrial Education.
B.S., Oregon State, 1950; M.A., Colorado State College, 1951; Ed.D., Oregon, 1965.

EDWARD DOYLE SMITH (1946, 1947)
Professor of English.
B.S.S., Oregon State, 1940; M.A., Oregon, 1951; Ph.D., Washington, 1966.

FRANK HERSCHEL SMITH (1936)
Professor Emeritus of Botany.
B.S., Arkansas, 1929; M.S., Washington State, 1930; Ph.D., Wisconsin, 1932.

FREDERICK JOHN SMITH (1964)
Extension Marine Economist; Associate Professor of Agricultural Economics.
B.S., Cornell, 1958; M.S., Oklahoma State, 1962; Ph.D., North Carolina State, 1965.

HOWARD GEORGE SMITH (1935)
Tillamook County Extension Chairman (Professor Emeritus).
B.S., Oregon State, 1935; M.S., 1967.

JOHN WOLFGANG SMITH (1964)
Professor of Mathematics.
B.A., Cornell, 1948; M.S., Purdue, 1950; Ph.D., Columbia, 1957.

KATHRYN HASKIN SMITH (1951-52, 1955)
Director of Teacher Placement (Associate Professor Emeritus).
B.S., Oregon, 1949; Ed.M., Oregon State, 1952.

KENNAN TAYLER SMITH (1968)
Professor of Mathematics.
B.A., Bowling Green, 1947; M.A., Harvard, 1948; B.A., Wisconsin, 1951.

RALSTON EARLE SMITH (1959)
Managing Editor, Continuing Education Publications, Division of Continuing Education. (Instructor).

ROBERT LLOYD SMITH (1962)
Associate Professor of Oceanography.
B.A., Reed, 1957; M.A., Oregon, 1959; Ph.D., Oregon State, 1964.

ROBERT WAYNE SMITH (1943)
Professor Emeritus of History.
B.A., Kansas, 1924; M.A., Idaho, 1932; Ph.D., California, 1937.

WESLEY WARREN SMITH (1947-48, 1956)
Professor of Mechanical Engineering.
B.Sc., Montana State, 1934, M.Eng., 1947.

WILLIAM CHARLES SMITH (1951)
Extension Broadcast Communication Specialist (Associate Professor).
B.S., Nebraska, 1942.

FORREST ARLO SNEVA (1952)
Assistant Professor of Range Management (Courtesy), Range Scientist, USDA, Squaw Butte Experiment Station.
B.S., Utah State, 1952.

CHARLES DALE SNOW (1966)
Assistant Professor of Fisheries (Courtesy), Project Leader for Shellfish Investigations, Fish Commission of Oregon.
B.A., Linfield College, 1951; M.S., Wyoming, 1952.

GERALDINE V. SNYDER (1968)
Instructor in Elementary Education.
M.Ed., Oregon, 1956.

PATRICIA ANN SNYDER (1970)
Research Associate in Biochemistry and Biophysics.
B.S., Syracuse, 1962; Ph.D., California at San Diego, 1970.

STANLEY PAUL SNYDER (1972)
Assistant Professor of Veterinary Medicine.
D.V.M., Colorado State, 1966, M.S., 1967; Ph.D., California (Davis), 1971.

MICHAEL RIDGMAN SODERQUIST (1966)
Instructor in Food Science and Technology.
B.S., Washington, 1964, M.S., 1967.

JEANETTE ANN SOELDNER (1973)
Instructor in Home Management.
B.S., Washington State, 1967; M.S., Oregon State, 1972.

INGVALD BEN SOLBERG (1947)
Associate Professor Emeritus of Landscape Architecture.
B.L.A., Cornell, 1924.

CHARLES KEVIN SOLLITT (1972)
Assistant Professor of Civil Engineering.
B.S.C.E., Washington, 1966, M.S.C.E., 1968; Ph.D., MIT, 1972.

LOREN DOUGLAS SOLUM (1969)
Assistant Trainer (Instructor), Intercollegiate Athletics.
B.S., Idaho, 1965; M.Ed., Oregon State, 1969.

FRANK CURTIS SORENSEN (1964)
Plant Geneticist, Forestry Sciences Laboratory, U. S. Forest Service; Assistant Professor of Forestry (Courtesy).
B.S., Montana, 1958; M.S., Florida, 1960; Ph.D., Oregon State, 1964.

GARY WARREN SORENSON (1968)
Associate Professor and Chairman of Economics.
B.A., Fresno State College, 1961; M.A., Claremont Graduate School, 1966, Ph.D., 1968.

B. LINN SOULE (1967)
Associate Professor of Business Administration.
B.S. E.E., Michigan, 1951; M.B.A., Ohio State, 1963; Ph.D., Michigan State, 1967. Registered Professional Electrical Engineer, Ohio, 1961; Michigan, 1963; Oregon, 1968.

PEARL V. SPEARS (1973)
Instructor in Education, Associate Director Portland Urban Teacher Education Program.
B.A., Wilbur Force Univ., 1968; M.A.T., Antioch, 1970.

MARILYN KAY SPEEDIE (1973)
Assistant Professor of Pharmacognosy.
B.S., Purdue, 1970, Ph.D., 1973.

JAMES BROOKES SPENCER (1963)
Associate Professor of History of Science. (General Science).
B.S., Lawrence College, 1948; M.S., Wisconsin, 1956, Ph.D., 1964.

LEE ADEN SPENCER (1967)
Instructor in Pharmaceutical Chemistry.
B.A. & B.S., Oregon State, 1958, M.S., 1967.

BERTRAND THOMAS SPERLING (1965)
Assistant Professor, Consultant, IRAM Center.
B.S., St. Lawrence University, 1948; B.S., MTR, USNPGS, Monterey, 1962.

LYLE JOSEPH SPIESSCHAERT (1970)
Linn County Extension Agent (Instructor).
B.S., Oregon State, 1970.

BERNARD ISRAEL SPINRAD (1972)
Professor of Nuclear Engineering.
B.S., Yale, 1942, M.S., 1944, Ph.D., 1945.

MARK RITTER SPONENBURGH (1961)
Professor of Art.
Diploma, Cranbrook Academy, 1940; Cert d'Etudes, Ecole des Beaux Arts (Paris), 1946; A.M., Cairo, 1953; M.A., London, 1957.

JOHN FREMONT SPROWLS (1952)
Multnomah County Extension Chairman (Professor).
B.S., Oklahoma State, 1942; M.S., Wisconsin, 1959.

CYRIL VELDE STADSVOLD (1963)
Associate Professor of Art and Architecture.
Jr. College Degree, State School of Science, North Dakota, 1952; B.Arch., North Dakota State, 1955. Architect, 1963.

ROBERT DELMER STALLEY (1956)
Professor of Mathematics.
B.S., Oregon State, 1946, M.A., 1948; Ph.D., Oregon, 1953.

DAVID LEE STAMP (1971)
Assistant Professor of Agronomic Crop Science.
B.S., Iowa State, 1964, M.S., 1968, Ph.D., 1971.

TIMOTHY JOHN STANAWAY (1973)
Financial Aid Counselor (Instructor).
B.A., Carroll College, 1962; M.E., Montana State, 1968.

MARYANNE K. STATON (1949-51, 1958-69, 1972)
Associate Professor of Home Economics.
B.A., B.S., Oregon State, 1949; M.S., 1950.

WARREN SPENCER STATON (1958)
Associate Professor of Civil Engineering.
B.A., B.S., Civil Engineering, Oregon State, 1950, M.S., Civil Engineering, 1951. Professional Engineer, State of Oregon, 1956.

FREDERICK LEE STAVER (1957)
Associate Professor of English.
B.A., California, 1949, M.A., 1951, Ph.D., 1963.

ROBERT LLOYD STEBBINS (1962)
Extension Horticulture Specialist (Associate Professor).
B.S., Colorado State University, 1955; M.S., California, 1959; Ph.D., Michigan State, 1970.

WILLIAM PERSHING STEPHAN (1968)
Director, Physician (Associate Professor), Student Health Service.
A.A., Sacramento Junior College, 1938; B.A., California, 1943; M.D., Medical School, California, 1945.

WILLIAM PROCURONOFF STEPHEN (1953)
Professor of Entomology.
B.S.A., Manitoba, 1948; Ph.D., Kansas, 1952. On leave 1973-75.

ROSCOE ELMO STEPHENSON (1923)
Professor Emeritus of Soils.
B.S., Purdue, 1915; M.S., Illinois, 1917; Ph.D., Iowa State, 1920.

ROBERT HOWARD STERLING (1940-42, 1956)
Baker County Extension Chairman (Professor).
B.S., Oregon State, 1935, M.S., 1962.

ROBERT HUGH STEVELY (1954)
Columbia County Extension Agent. 4-H Club (Assistant Professor).
B.S., Cornell, 1941.

GEORGE F. STEVENS (1963)
Associate Dean of Students for Student Activities (Professor); Director, Memorial Union.
B.A., Iowa, 1950; Ed.M., Oregon State, 1968.

JOE BRUCE STEVENS (1966)
Associate Professor of Agricultural Economics.
B.S., Colorado State, 1958; M.S., Purdue, 1963; Ph.D., Oregon State, 1965.

ELMER CLARK STEVENSON (1967)
Director of Resident Instruction, Associate Dean of Agriculture (Professor).
B.S., Maryland, 1937; Ph.D., Wisconsin, 1942.

JOHN R. STEWART (1971)
Assistant Professor of Architecture and Landscape Architecture.
B.S., Oregon State, 1969.

RUTH E. STIEHL (1972)
Assistant Professor of Education, Educational Media.
A.B., Northwest Nazarene, 1966; M.Ed., Eastern Washington, 1969; Ed.D., Idaho, 1972.

THOMAS EDWARD STITZEL (1966)
Associate Professor of Business Administration.
B.S., Washington State, 1957; M.B.A., Oregon, 1964, D.B.A., 1966. Registered Professional Engineer, Oklahoma, 1961.

HERBERT HORST STOEVENER (1962)
Professor of Agricultural Economics.
B.S., Cornell, 1958; M.S., Illinois, 1962, Ph.D., 1963.

CARL HENRY STOLTENBERG (1966)
Dean of School of Forestry, Director of Forest Research Laboratory, Professor of Forestry.
B.S., California, 1948, M.F., 1949; Ph.D., Minnesota, 1952.

LOUIS NELSON STONE (1947)
Professor of Electrical and Computer Engineering.
B.S., Oregon State, 1939.

SOLON ALLEN STONE (1956)
Assistant Dean of Engineering; Professor of Electrical Engineering.
B.S., Oregon State, 1952; Professional Engineer, 1960.

WILLIAM MATTHEWSON STONE (1947)
Professor of Mathematics.
B.A., Willamette, 1938; M.A., Oregon State, 1940; Ph.D., Iowa State, 1947.

ARTHUR IRA STONEHILL (1966)
Professor of Business Administration.
B.A., Yale, 1953; M.B.A., Harvard, 1957; Ph.D., California (Berkeley), 1965.

ROBERT MACLEOD STORM (1948)
Professor of Zoology.
B.E., Northern Illinois State Teachers, 1939; M.S., Oregon State, 1941, Ph.D., 1948.

FREDRICK STORMSHAK (1968)
Associate Professor of Animal Science.
B.S., Washington State, 1959, M.S., 1960; Ph.D., Wisconsin, 1965.

CLARA A. STORVICK (1945)
Professor Emeritus of Foods and Nutrition.
A.B., St. Olaf College, 1929; M.S., Iowa State, 1933; Ph.D., Cornell, 1941.

FLOYD MADISON STOUT (1959)
Associate Professor of Animal Nutrition.
B.S., Colorado State, 1953; M.S., Oregon State, 1959, Ph.D., 1960.

AUGUST LEROY STRAND (1942)
Preident Emeritus of Oregon State University; Professor Emeritus.
B.S., Montana State, 1917; M.S., Minnesota, 1925, Ph.D., 1928; LL.D. (honorary), Montana State, 1957.

BERNICE STRAWN (1959)
Extension Specialist in Home Management (Professor Emeritus).
B.S., Iowa State, 1927, M.S., 1931.

LARRY LEE STREEBY (1970)
Assistant Professor of Forest Management.
B.S., Iowa State, 1963, M.S., 1965; Ph.D., Wisconsin, 1974.

LESTER BRADEN STRICKLER (1954)
Professor of Business Administration; Chairman Marketing, Finance and Production.
B.A., Pennsylvania State, 1948, M.A., 1949; D.B.A., Indiana, 1954.

MONINE MILLER STRODE (1970)
Yamhill County Extension Agent, Home Economics (Instructor).
B.A., Central Washington State, 1968.

ELIZABETH STRONG (1960)
Assistant Professor of Oceanography.
B.A., State University of New York (Albany), 1937.

RICHARD KIM STROUD (1972)
Research Associate in Veterinary Medicine.
B.S., Oregon State, 1965, D.V.M., Washington State, 1972.

EDWIN DAVID STROWBRIDGE, JR. (1964)
Associate Professor of Education.
B.S., Oregon State, 1950; M.Ed., Lewis & Clark College, 1956, D.Ed., Oregon, 1967.

LAUREL EILEEN STULKEN (1972)
Extension Agent, 4-H and Youth Development (Instructor).
B.S., North Dakota State, 1968; M.S., Colorado State, 1971.

ALAN IWAO SUGAWARA (1970)
Assistant Professor of Family Life.
B.A., Hawaii, 1961; M.Div., Chicago Theological Seminary, 1965; M.A., Michigan State, 1967; Ph.D., Oregon State, 1970.

NONDA LEONA SUNDAY (1972)
Crook County Extension Agent (Instructor).
B.A., Linfield, 1971.

CHARLES FEARN SUTHERLAND, JR. (1959)
Associate Professor of Forest Economics.
B.S., Idaho, 1948, M.F., 1954; Ph.D., Michigan, 1961.

SANDRA J. SUTTIE (1969)
Assistant Professor of Physical Education.
B.S., Colorado, 1960; M.S., Oregon, 1962; Ph.D., Southern California, 1970.

GRANT ALEXANDER SWAN (1926)
Associate Professor Emeritus of Physical Education.
B.S., Oregon State, 1922; M.S., Washington, 1951.

LLOYD VERNON SWANSON (1971)
Assistant Professor, Dairy Physiology.
B.S., Minnesota, 1960, M.S., 1967; Ph.D., Michigan State, 1970.

STANLEY LEONARD SWANSON (1963)
Instructor in Agronomy (Courtesy).
B.S., in Soils Science, California State Polytechnic College, 1953.

STANLEY STEWART SWANSON (1962)
Head, Bibliographic Selection and Evaluation (Associate Professor), Library.
B.A., Colorado, 1949, M.Ed., 1953; M.A.L.S., Michigan, 1956.

DOUGLAS NEIL SWANSTON (1971)
Research Geologist, U. S. Forest Service; Assistant Professor of Forestry (Courtesy).
B.S., Michigan, 1960; M.A., Bowling Green State, 1963; Ph.D., Michigan State, 1967.

KNUD GEORGE SWENSON (1954)
Professor of Entomology.
B.S., South Dakota State, 1948; Ph.D., California, 1951.

L. WAYNE SWENSON (1968)
Associate Professor of Physics.
B.S., M.I.T., 1954, Ph.D., 1960.

WILLIAM R. SWICK (1973)
Instructor in Business Administration.
B.A., Washington State, 1971.

KLINE RUTHVEN SWYGARD (1947)
Professor of Political Science.
B.A., Washington, 1935, Ph.D., 1950.

WILLIAM EVANS SYPE (1973)
Instructor in Zoology.
B.A., Illinois Wesleyan, 1966; M.S., Oregon State, 1968.

GERTRUDE TANK (1953)
Associate Professor Emeritus of Nutrition Research.
D.D.S., Temple, 1916.

GENE N. TANSELLI (1962)
Associate Professor of Physical Education.
B.S., Oregon State, 1951, M.Ed., 1960.

ESTHER ADELIA TASKERUD (1947)
Assistant Director, Cooperative Extension Service (Professor Emeritus).
B.S., South Dakota State, 1933; M.A., Columbia, 1947; Sc.D., South Dakota State, 1962.

WILLIAM HARRIS TAUBENECK (1951)
Professor of Geology.
B.S., Oregon State, 1949, M.S., 1950; Ph.D., Columbia, 1955.

LISA WAITE TAUBMAN (1956)
Assistant Professor of Psychology.
B.A., Washington, 1948; M.Ed., Mills College, 1952.

EDWARD MORGAN TAYLOR (1966)
Associate Professor of Geology.
B.S., Oregon State, 1957, M.S., 1960; Ph.D., Washington State, 1967.

NORTON OSCAR TAYLOR (1946-48, 1949)
Umatilla County Extension Agent (Associate Professor Emeritus).
B.S., Oregon State, 1942.

WAYNE PENDLETON TAYSOM (1953)
Professor of Art.
B.F.A., Utah, 1948; M.A., Columbia, 1950.

RAY HOLT TEAL (1950)
Extension International Seed & Grain Marketing Specialist (Associate Professor Emeritus).
B.S., Illinois, 1935, M.S., 1937.

HENRY ARNOLD TEN PAS (1948)
Director, Division of Undergraduate Studies, School of Education; Professor of Career Education.
B.S., Wisconsin, 1940; M.S., Oregon State, 1949; Ed.D., Washington State, 1954.

CHARLES W. TERHUNE (1972)
Associate Professor of Health (Courtesy).
M.D., Northwestern University Medical School, 1963.

JOHN J. TERPSTRA, JR. (1971)
Associate Professor of Military Science; Lt. Col., Corps of Engineers.
B.S., Oregon State, 1958; M.S., Oklahoma State, 1966.

LEON C. TERRIERE (1950)
Professor of Biochemistry and Insect Toxicology, Agricultural Chemistry and Entomology.
B.S., Idaho, 1943; Ph.D., Oregon State, 1950.

LINDA ANNE THIEL (1967)
Assistant Professor of Clothing, Textiles, and Related Arts.
B.S., Oregon State, 1957; M.S., 1967.

JOHN RALPH THIENES (1952)
Wasco County Extension Agent (Associate Professor).
B.S., Oregon State, 1949; M.S., Michigan State, 1968.

RICHARD WILLIAM THIES (1968)
Assistant Professor of Chemistry.
B.S., Michigan, 1963; Ph.D., Wisconsin, 1967.

MARTIN BERNHARDT THINGVOLD (1954)
Benton County Extension Agent (Assistant Professor).
B.S., Oregon State, 1953.

CHARLES EDWIN THOMAS (1918)
Professor Emeritus of Mechanics and Materials.
M.E., Cornell, 1913, M.M.E., 1931.

DALE OREN THOMAS (1956)
Professor of Physical Education; Wrestling Coach.
B.A., Cornell College, 1947; M.P.E., Purdue, 1948; Ph.D., Iowa, 1956.

DAVID REGINALD THOMAS (1967)
Associate Professor of Statistics.
B.S., Oregon State, 1960, M.S., 1962; Ph.D., Iowa State, 1965.

HOWARD R. THOMAS (1967)
Agricultural Economist, USDA (Courtesy Instructor).
B.S., Utah State, 1966, M.S., 1968.

JAMES M. THOMAS (1973)
Assistant Professor of Speech Communication.
B.A., St. Ambrose College, 1966; M.A., Villanova, 1968.

MARION DAWS THOMAS (1937-45, 1947)
Extension Specialist, Tax Policy Education (Professor).
B.S., Oregon State, 1937.

T. DARRAH THOMAS (1971)
Professor of Chemistry.
B.S., Haverford College, 1954; Ph.D., California (Berkeley), 1957.

BENJAMIN GARRISON THOMPSON (1924)
Professor Emeritus of Entomology.
B.S., Oregon State, 1918; M.S., 1924; Ph.D., Washington, 1939.

BETTY LYND THOMPSON (1927)
Associate Professor Emeritus of Physical Education.
A.B., Illinois Wesleyan, 1923; M.A., Wisconsin, 1926.

EDWARD DAVID THOMPSON (1972)
Instructor in Microbiology.
A.A., Peninsula College, 1963; B.A., Western Washington State, 1965, M.S., 1967; Ph.D., Washington State, 1970.

CLARENCE GARRISON THOMPSON (1960)
Entomologist, U.S. Forest Service; Professor of Entomology (Courtesy).
B.S., Oregon State, 1940; M.S., California, 1947, Ph.D., 1950.

GEORGINE EMMILLY THOMPSON (1969)
Psychiatric Social Worker (Instructor), Student Health Service.
B.S., Michigan State, 1964; M.S.W., Illinois, 1969, A.C.S.W., 1972.

JOHN GRAY THOMPSON (1948)
Portland City Extension Agent, 4-H and Youth (Associate Professor).
B.S., Oregon State, 1948; M.S., Michigan State, 1967.

MAXINE MARIE THOMPSON (1964)
Associate Professor of Horticulture.
B.S., California, 1948, M.S., 1951, Ph.D., 1960.

THOMAS WILLIAM THOMPSON (1949)
Wasco County Extension Chairman (Professor).
B.S., Oregon State, 1949, M.Ag., 1971.

GEORGE EARL THORNBURGH (1952)
Professor of Mechanical Engineering.
B.S., Nebraska, 1944; M.S., Iowa State, 1950.

ROBERT WALLACE THRESHER (1970)
Assistant Professor of Mechanical Engineering.
B.S., Michigan Tech., 1962, M.S., 1967; Ph.D., Colorado State University, 1970.

ROBERT LEWIS TICKNOR (1959)
Professor of Horticulture, North Willamettte Experiment Station.
B.S., Oregon State, 1950; M.S., Michigan State, 1951, Ph.D., 1953,

GARY HOWARD TIEDEMAN (1970)
Assistant Professor of Sociology.
B.A., Colorado, 1961; M.A., Stanford, 1963; Ph.D., North Carolina, 1968.

GEORGE WAYNE TIGER (1966)
Extension Certification Assistant (Instructor).
B.S. Farm Crops, Oregon State, 1966.

E. DORIS TILLES (1968)
Gifts and Exchange Librarian (Assistant Professor).
A.B., California (Berkeley), 1956, M.L.S., 1957.

THOMAS NORMAN TILLMAN (1969)
Assistant Professor of Physical Education.
B.S., Michigan, 1951; M.A., Michigan State, 1964, Ph.D., 1972.

GREGORY DAVIS TILLSON (1970)
Marion County Extension Agent (Instructor).
B.S., Oregon State, 1970.

GERTRUDE BERNICE TINGELSTAD (1964)
Catalog Librarian (Assistant Professor).
A.B., Luther College, 1941; A.B.L.S., Michigan, 1942; M.A., Minnesota, 1959.

IAN JAMES TINSLEY (1957)
Professor of Chemistry, Agricultural Chemistry.
B.Sc., Sydney University (Australia), 1950; M.S., Oregon State, 1955, Ph.D., 1958.

PIA AGNETA TOLLO (1969)
Social Science-Humanities Librarian (Instructor).
A.A., Foothill College, 1965; B.A., California at Santa Barbara, 1967; M.S., Washington, 1969.

FRANCES WATTS TORBECK (1958)
Coos County Extension Agent (Home Economics) (Assistant Professor).
B.S., Minnesota, 1949.

JAMES E. TORPEY (1971)
Associate Professor of Physical Education.
B.S., Springfield College, 1952, M.S., 1953; Ed.D., Oregon, 1965.

PALMER STANLEY TORVEND (1939)
Extension Area Supervisor (Professor).
B.S., Oregon State, 1938; M.S., Columbia, 1953.

RICHARD EDWARD TOWEY (1962)
Associate Professor of Economics.
B.S., University of San Francisco, 1954; M.A., California (Berkeley), 1957; Ph.D., 1967.

JAMES MARTIN TRAPPE (1965)
Associate Professor of Botany (Courtesy), Forest Sciences Laboratory, Principal Mycologist, U. S. Forest Service.
B.S., Washington, 1953; M.F., S.U.N.Y. Syracuse, 1955, Ph.D., Washington, 1962.

BESSIE GWYNETH TRESSLER (1946)
Acquisitions Librarian (Associate Professor Emeritus).
A.B., Emporia, 1926; B.S. (Lib.Sc.), Illinois, 1930.

JOHN EDWIN TRIERWEILER (1969)
Assistant Professor of Agricultural Economics (Courtesy).
B.S., South Dakota State, 1963, M.S., 1964; Ph.D., Nebraska, 1969.

EDWARD JOHN TRIONE (1959)
Professor of Botany and Plant Pathology (Courtesy); Biochemist, USDA.
B.A., Chico State, 1950; Ph.D., Oregon State, 1957.

VIJAI K. TRIPATHI (1974)
Visiting Assistant Professor of Electrical and Computer Engineering.
B.Sc., Agra Univ., 1958; M.Sc., Tech., Allahabad Univ., 1961; M.S.E.E., Michigan, 1964, Ph.D., 1968.

FRANK JOHN TRISKA (1973)
Research Associate in Fisheries.
B.S., Pittsburgh, 1965, Ph.D., 1970.

EDRIE DALE TROUT (1962)
Professor of Radiological Physics, X-Ray Science & Engineering, General Science, Director, X-Ray Science and Engineering Laboratory.
B.S., Franklin College, 1922, D.Sc. (Honorary), 1952.

CLIFFORD WAYNE TROW (1965)
Associate Professor of History.
A.B., Kansas Weslevan University, 1951; M.A., Colorado, 1958; Ph.D., 1966.

JO ANNE J. TROW (1965)
Associate Dean of Students, Professor of Education.
B.A., Denison University, 1953; M.A., Indiana, 1956; Ph.D., Michigan State, 1965.

JACK DUANE TULLIS (1974)
Instructor in Agricultural Engineering.
B.S., Brigham Young, 1963.

D. GRAHAM TWEEDY (1969)
Research Associate in Entomology (Courtesy).
B.S.A., UBC, 1959; M.S., Oregon State, 1967, Ph.D., 1969.

PETER A. TYERMAN (1967)
OB/GYN Consultant (Professor), Student Health Service.
B.A., Oregon, 1957; M.D., George Washington University School of Medicine, 1961.

CHARLES HOWARD ULLERY (1970)
Assistant Professor of Soil Science.
B.S., Ohio State, 1964, M.S., 1967; Ph.D., Colorado State, 1971.

DONALD BEN UNGER (1972)
Physical Sciences Librarian (Instructor).
B.A., William Jewell College, 1956; M.L.S., Oklahoma, 1972.

DAVID B. VALENCIA (1973)
Acting Director, Educational Opportunities (Instructor).
B.S., Oregon College of Education, 1972.

PAUL BARTHOLOMEW VALENTI (1949)
Associate Professor, Assistant to the Athletic Director, Tennis Coach.
B.S., Oregon State, 1947, M.S., 1957.

CAROL ANN VALENTINE (1970)
Assistant Professor of Speech Communication and Speech Education.
B.A., Michigan, 1964, M.A., 1965; Ph.D., Pennsylvania State, 1971.

MILTON ALBERT VALENTINE (1964)
Professor of Speech Communication.
A.B., Stanford, 1945, M.A., 1950, Ph.D., 1957.

TJEERD HENDRIK van ANDEL (1968)
Professor of Oceanography.
B.S., University of Groningen, 1946, M.S., 1948, Ph.D., 1950.

NORBERT JOSEPH VANDEHEY (1959)
Lane County Extension Agent, 4-H and Youth (Associate Professor).
B.S., Oregon State, 1949; M.Ed., Linfield College, 1955.

HENRY VAN DYKE (1963)
Associate Professor of Biology, (General Science).
B.S., Western Reserve, 1947; M.A., Michigan, 1949, Ph.D., 1955.

KENSAL EDWARD VAN HOLDE (1967)
Professor of Biophysics.
B.S., Wisconsin, 1949, Ph.D., 1952. On sabbatical 1973-74.

EDNA MARJORIE VAN HORN (1939-40, 1942, 1944)
Professor Emeritus of Home Administration.
B.A., Colorado College, 1923; M.A., Columbia, 1932, Ph.D., 1953.

ANTONE CORNELIS VAN VLIET (1955)
Associate Professor of Forest Products, Associate Director, Office of Careers, Planning and Placement.
B.S., Oregon State, 1952, M.S., 1958; Ph.D., Michigan State, 1970.

VERIL VAN VOLK (1966)
Associate Professor of Soil Science.
B.Sc., Ohio State, 1960, M.S., 1961; Ph.D., Wisconsin, 1965.

TIMOTHY CARL VARGAS (1973)
Crook County Extension Agent (Instructor).
B.S., California Polytechnic, 1971.

DENNIS LAWRENCE VARIN (1973)
Instructor in Business Administration.
B.S., Southern Oregon, 1967, M.S., 1970.

FREDA TEITZEL VARS (1965)
Assistant Professor of Home Management.
B.S., Washington State, 1962; M.S., Oregon State, 1966.

R. CHARLES VARS, JR. (1966)
Associate Professor of Economics.
B.S.B.A., Denver, 1958, M.B.A., 1960; M.A., California (Berkeley), 1965, Ph.D., 1969.

GEORGE WALLACE VARSEVELD (1963)
Assistant Professor of Food Science and Technology.
B.S., University of Alberta, 1947; M.S., Oregon State, 1953.

EDWARD KEMP VAUGHAN (1947)
Professor of Plant Pathology.
B.S., New Mexico State, 1929; M.S., Oregon State, 1932; Ph.D., Minnesota, 1942.

MARTIN VAVRA (1971)
Assistant Professor of Animal Science, Acting Superintendent, Eastern Oregon Experiment Station.
B.S., Arizona, 1966, M.S., 1969; Ph.D., Wyoming, 1972.

B. J. VEITS (1965)
Associate Professor of Wildlife Ecology.
B.S., Missouri, 1954; M.S., Southern Illinois. 1956, Ph.D., 1965.

RAY A. VERZASCONI (1967)
Associate Professor of Spanish, Modern Languages.
B.A., California (Berkeley), 1960; M.A., Washington, 1962, Ph.D., 1965.

MARLOW VESTERBY (1967)
Agricultural Economist (Economic Research Service, USDA (Courtesy Instructor).
B.S., Montana State, 1961, M.S., 1965.

HAROLD ROTH VINYARD (1938)
Associate Professor Emeritus of Physics.
B.S. (E.Eng.), Oregon State, 1924, M.S., 1928; Ph.D., Pennsylvania State, 1938.

CHARLES ANTHONY VISGATIS (1969-71, 1972)
Visiting Instructor in Art.
B.A.E., Art Institute of Chicago, 1957; M.A., Northwestern, 1963.

PAUL ANTHONY VOHS, JR. (1968)
Associate Professor of Wildlife Ecology.
B.S., Kansas State, 1955; M.A., Southern Illinois, 1958; Ph.D., Iowa State, 1964.

IRENE ELAINE VOIT (1970)
Librarian, Reserve Book Room, (Assistant Professor).
B.A., Brooklyn College, 1966; M.S.L.S., Drexel Institute, 1968.

JAMES ARTHUR VOMOCIL (1967)
Extension Soil Science Specialist (Professor).
B.S., Arizona, 1950; M.S., Michigan State, 1951; Ph.D., Rutgers, 1956.

FRANK VON BORSTEL, JR. (1948)
Marion County Extension Agent, 4-H and Youth (Associate Professor).
B.S., Oregon State, 1948; M.Agr.Sc., University of New Zealand, 1952.

LESTER RAY VOUGH (1972)
Extension Agronomist, Agronomic Crop Science (Assistant Professor).
B.S., Penn State, 1966; M.S., Minnesota, 1969; Ph.D., Purdue, 1972.

STANLEY ELLIOTT WADSWORTH (1946)
Associate Professor of Floriculture.
B.S., Cornell, 1935.

JOSEPH MARK WAGENER (1969)
Assistant Professor, Clinical Psychologist, Student Health Service.
A.B., Ohio, 1962; M.A., Kent State University, 1964; Ph.D., Purdue, 1969.

CARL BERNARD WAGNER (1965)
Associate Professor, Varsity Track and Cross Country Coach, Intercollegiate Athletics.
A.B., Stanford, 1948, M.A., 1949.

HARRY HENRY WAGNER (1959)
Assistant Professor of Fisheries (Courtesy); Chief, Research Division, Oregon Wildlife Commission.
B.S., Humboldt State, 1955; M.S., Oregon State, 1959, Ph.D., 1970.

SHELDON L. WAGNER (1966)
Professor of Agricultural Chemistry and Environmental Health Science.
B.S., Wisconsin, 1954; M.D., University of Wisconsin Medical School, 1957.

RODNEY KING WALDRON (1954)
Director of Libraries (Professor).
B.A., Denver, 1950, M.A., 1950.

JOSEPH HOWE WALES (1959)
Associate Professor of Food Science and Technology.
B.A., Stanford, 1930, M.A., 1931.

MARY JANE WALL (1973)
Associate Professor of Education, Guidance and Counseling.
B.S., Nebraska, 1946; M.S., Drake, 1955; Ed.D., Oregon State, 1973.

ALEXANDER S. WALLACE (1965)
Associate Professor of Speech Communication.
B.A., Kansas State Teachers College, 1960; M.A., Kent State, 1961.

ALICE LOCKWOOD INGALLS WALLACE (1954)
Assistant Professor of Speech Communication.
B.S., Oregon State, 1932; M.A., Northwestern, 1938.

BETTY M. WALLACE (1965)
Instructor in Speech Communication.
B.A., Sterling College, 1956.

ROBERT BOEN WALLS (1947)
Professor of Music.
B.E., Minnesota State Teachers (Moorhead), 1932; M.S., North Dakota, 1936.

DON COIN WALROD (1948)
Columbia County Extension Chairman (Associate Professor).
B.S., Colorado State University, 1942; M.S., Michigan State, 1960.

AUSTIN FREDERIC WALTER (1950)
Professor of Political Science.
B.A., Carleton, 1940; M.A., Fletcher School of Law and Diplomacy, 1942; Ph.D., Michigan, 1954.

KENNETH DALE WALTERS (1972)
Assistant Professor of Business Administration.
B.A., Walla Walla College, 1963; J. D., Stanford, 1966; State Bar of California, 1967; Ph.D., California (Berkeley), 1972.

RICHARD BRIAN WANDSCHNEIDER (1971)
Extension Agent, Rural Manpower Development (Instructor).
B.A., California (Riverside), 1964.

CHIEN-YI WANG (1969)
Research Associate, Mid-Columbia Experiment Station.
B.S., National Taiwan University, 1964; Ph.D., Oregon State, 1969.

CHIH HSING WANG (1950)
Professor of Chemistry; Director, Radiation Center; Director, Institute of Nuclear Science and Engineering; Head, Department of Nuclear Engineering.
B.S., University of Shantung, China, 1937; M.S., Oregon State, 1947, Ph.D., 1950.

JERRY E. WARD (1973)
Associate Professor of Military Science, Lt. Col.
B.B.A., Texas, 1956; M.B.A., Oregon State, 1973.

MARGARET CHRISTIAN WARE (1945)
Assistant Professor Emeritus of Foods and Nutrition.
B.S., Oregon State, 1941, M.S., 1944.

RICHARD HARVEY WARING (1963)
Associate Professor of Forest Management.
B.S., Minnesota, 1957, M.S., 1959; Ph.D., California, 1963.

CHARLES F. WARNATH (1961)
Professor of Psychology.
A.B., Princeton, 1949; M.A., Teacher's College, Columbia, 1951; Ph.D., Columbia, 1954.

HARRIET JANET WARNER (1930)
Assistant Reference Librarian (Assistant Professor Emeritus).
A.B., California, 1919; Certificate of Librarianship, 1930.

CHARLES EDWARD WARREN (1953)
Professor of Fisheries.
B.S., Oregon State, 1949, M.S., 1951; Ph.D., California, 1961.

KENNETH LEE WARREN (1961)
Head, Instructional Materials & Educational Services—Audiovisual Instruction, Associate Professor, Division of Continuing Education.
B.S., Oregon, 1953; M.A., Fresno State, 1961. On leave of absence 1973-74.

REX WARREN (1934-45, 1947)
Extension Farm Crops Specialist (Professor Emeritus).
B.S., Utah State, 1931; M.S., Oregon State, 1933.

ALLEN LOWELL WASSERMAN (1965)
Associate Professor of Physics.
B.S., Carnegie Institute of Technology, 1956; Ph.D., Iowa State, 1963.

JOSEPHINE WASSON (1943)
Associate Professor Emeritus of Art and Architecture.
B.A., Washington State, 1925; M.A., Columbia, 1933.

JOHN LOWE WATSON (1947)
Controller, Oregon State Board of Higher Education (Professor).
B.A., Washington, 1939; C.P.A., Washington, 1939; Oregon, 1952.

DAROLD DUANE WAX (1962)
Professor of History.
B.A., Washington State, 1956; M.A., Washington 1959, Ph.D., 1962.

ROGER K. WEAVER (1962)
Associate Professor of English.
B.A., Oregon, 1957; M.A., Washington, 1962; M.F.A., Oregon, 1967.

WARREN L. WEBB (1971)
Research Associate in Forest Management.
B.S., Oregon State, 1959, M.S., 1967, Ph.D., 1971.

NANCY RUTH WEBBER (1971)
Head, Library Business Records Department (Assistant Professor).
B.A., Massachussetts, 1942; M.L.S., Simmons College, 1970.

MYRON L. WEBER (1972)
Assistant Professor of Business Administration.
S.B., MIT, 1965, S.B., 1966; M.A., Minnesota, 1970.

LAVERN JOHN WEBER (1969)
Associate Professor of Pharmacology and Fisheries.
A.A.S., Everett Commercial College, 1956; B.A., Pacific Lutheran University, 1958; M.S., Washington, 1962, Ph.D., 1964.

LEONARD JOSEPH WEBER (1954)
Professor of Electrical and Computer Engineering; Director, University Honors Program.
B.S., Oregon State, 1952; M.S., Washington, 1962.

EMMA LOUISE WEBSTER (1953)
Multnomah County Extension Agent, Home Economics (Associate Professor).
B.S., Washington State, 1930. Emeritus.

E. EDWARD WEDMAN (1971)
Professor and Head of Veterinary Medicine.
D.V.M., Kansas State, 1945; M.P.H., Minnesota, 1954, Ph.D., 1964.

GLEN ALDEN WEEKS (1971)
Assistant Professor of Naval Science.
B.S., U. S. Naval Academy, 1965.

JEROME CONRAD WEILER (1969)
Assistant Professor of Business Administration.
B.B.A., Michigan, 1948; C.P.A., Colorado, 1951; M.B.A., Air Force Institute of Technology, 1959.

RICHARD J. WEINMAN (1967)
Professor of Speech Communication (Broadcast Media Communication).
A.B., Indiana, 1955; M.A., Columbia, 1956; Ph.D., Indiana, 1965.

JOHN WEIMAR (1972)
Douglas County Extension Agent (Instructor).
B.S., Oregon State, 1970.

ERMA MARION WEIR (1945)
Professor of Physical Education.
B.E., Minnesota State Teachers (Bemidji), 1936; M.S., Washington, 1941.

JEAN B. WEIR (1970)
Assistant Professor of Art.
B.A., Boston University, 1951; M.A., North Carolina, 1966.

CONRAD JOHN WEISER (1973)
Professor and Head of Horticulture.
B.S., North Dakota State, 1957; Ph.D., Oregon State, 1960.

JESSE DAVIS WELLONS III (1970)
Associate Professor of Forest Products Chemistry.
B.S., Duke, 1960, M.F., 1963, Ph.D., 1966.

EARL WILLIAM WELLS (1921)
Professor Emeritus of Speech Communication.
A.B., Iowa, 1921; M.A., Wisconsin, 1927; J.D., Iowa, 1928.

VERA LUCILE WELLS (1948)
Assistant Professor Emeritus of Clothing, Textiles, and Related Arts.
B.S., Oregon State, 1948, M.S., 1953.

JAMES RICHARD WELTY (1958)
Professor of Mechanical Engineering; Head, Mechanical and Metallurgical Engineering.
B.S. (M.E.), Oregon State, 1954, M.S. (M.E.), 1959, Ph.D. (Chem. E.), 1962.

LYNDA GAY WENDEL (1972)
Instructor in Business Administration.
B.S., Oregon, 1969, M.B.A., 1972.

ROBERT BERNARD WENSINK (1973)
Assistant Professor of Agricultural Engineering.
B.Ag., Ohio State, 1969, M.S., 1969.

HAROLD ELDON WERTH (1949-51, 1956)
Benton County Extension Agent (Associate Professor).
B.S., Oregon State, 1948; M.S., Michigan State, 1966.

THOMAS MOORE WEST (1973)
Instructor in Industrial and General Engineering.
B.S.I.E., Tennessee, 1963, M.S., 1965.

WILLIAM IRVIN WEST (1946)
Professor of Forest Products.
B.S.F., Washington, 1939, M.F., 1941. On leave through 1974.

HAZEL KELSEY WESTCOTT (1919-21, 1926)
Administrative Assistant (Assistant Professor), President's Office. (Retired.)
B.S., Oregon State, 1920.

PETER HUGHES WESTIGARD (1962)
Professor of Entomology, Southern Oregon Experiment Station.
A.B., San Jose State, 1956; Ph.D., California, 1961.

MELVIN NEIL WESTWOOD (1960)
Professor of Horticulture.
B.S., Utah State, 1952; Ph.D., Washington State, 1956.

PAUL HENRY WESWIG (1941)
Professor of Chemistry, Agricultural Chemistry.
B.A., St. Olaf College, 1935; M.S., Minnesota, 1939, Ph.D., 1941.

PHILIP DANIEL WHANGER (1966)
Associate Professor of Agricultural Chemistry.
B.S., Berry College, 1959; M.S., West Virginia, 1961; Ph.D., North Carolina State, 1965.

CHARLAINE PATRICIA WHEELER (1973)
Instructor in Business Administration.
B.S., Walla Walla College, 1965; M.Ed., Oregon State, 1973.

WILLIAM PERRY WHEELER (1949)
Professor of Forest Management; Head Adviser, School of Forestry.
B.S., Minnesota, 1948, M.F., 1949; Ph.D., Syracuse (New York State College of Forestry), 1967.

JAMES DAVID WHITE (1971)
Associate Professor of Chemistry.
B.A., Cambridge, 1959; M.Sc., British Columbia, 1961; Ph.D., MIT, 1965.

LYDIA ALICE WHITE (1970)
Assistant Director (Instructor), Residence Programs.
B.S., Missouri, 1966, B.A., 1966, M.Ed., 1967.

MARJORIE JOANN WHITE (1963)
Associate Professor of Education.
B.Ed., San Jose State, 1952; M.Ed., Oregon, 1957; Ed.D., Wayne State, 1963.

PEARL HAGEN WHITE (1969)
Instructor in Music.
B.A., Minot State Teachers College, 1942.

WILLIAM HUMES WHITE (1968)
Assistant Professor of Civil Engineering.
B.S. (C.E.), Idaho, 1963; M.S. (C.E.), University of Colorado, 1966; Ph.D. (C.E.), 1971.

LEO WHITLOW (1970)
Multnomah County Extension Agent (Assistant Professor).
B.A., Langston University, 1949; M.A., Oklahoma, 1956.

WILLIAM QUENTIN WICK (1960)
Director, Sea Grant College Program; Professor of Wildlife Ecology.
B.S., Oregon State, 1950, M.S., 1952.

BOYD ELLIS WICKMAN (1967)
Supervisory Research Entomologist, Forestry Sciences Laboratory; Associate Professor of Entomology (Courtesy).
B.S., California (Berkeley), 1958, M.S., 1966.

H. HOLLIS WICKMAN (1971)
Associate Professor of Chemistry.
A.B., Nebraska at Omaha, 1959; Ph.D., California at Berkeley, 1964.

CHARLES EDWARD WICKS (1954)
Professor and Head of Chemical Engineering.
B.S., Oregon State, 1950; M.S., Carnegie Institute of Technology, 1952, Ph.D., 1954.

WILBUR WILSON WIDICUS, JR. (1964)
Associate Professor of Business Administration, Associate Dean and Director of Graduate Studies in Business.
B.S., Southern Illinois University, 1958; M.B.A., Indiana, 1959; Ph.D., Columbia, 1964.

JOHN ANTHONY WIENS (1966)
Associate Professor of Zoology.
B.S., Oklahoma, 1961; M.S., Wisconsin, 1963, Ph.D., 1966. On sabbatical 1973-74.

HOWARD MORGAN WIGHT (1964)
Professor of Wildlife Ecology (Courtesy); Leader, Oregon Cooperative Wildlife Research Unit, Bureau of Sport Fisheries and Wildlife.
B.S., Oregon State, 1948; M.S., Pennsylvania State, 1950.

PETER G. WIINIKKA (1972)
Instructor in Physical Science (General Science).
B.A., San Jose State, 1965, M.A., 1966.

BERT GUY WILCOX (1962)
Klamath County Extension Acting Chairman (Associate Professor).
B.S., Utah State, 1957; M.S., Oregon State, 1961.

CHARLES FREDERICK WILHELM (1972)
Major, USAF; Assistant Professor of Aerospace Studies.
B.S., Air Force Institute of Technology, 1965; M.S., Southern California, 1972.

NANCY RUTH WILHELMSON (1972)
Instructor in Clothing, Textiles and Related Arts.
B.S., Iowa State, 1970; M.S., Illinois, 1972.

LYNN W. WILKES (1972)
Agricultural Economist, Economic Research Service, USDA (Courtesy Instructor).
B.A., Utah State, 1956; M.A., Maryland, 1959.

BILLY HUGHEL WILKINS (1961)
Professor of Economics.
B.B.A., Texas A & I University, 1956, M.S., 1957; Ph.D., Texas, 1962.

JOHN R. WILKINS (1972)
Agricultural Economist, Economic Research Service, USDA (Courtesy Instructor).
B.A., Utah State, 1962; M.A., Arizona, 1968.

DALE HERBERT WILLEY (1959)
Assistant Professor of English.
B.A., Linfield, 1950; M.A., Washington State, 1952.

BRIAN ROBERT WILLIAMS (1970)
Assistant Professor of Psychology.
B.S., Brigham Young University, 1966, M.S., 1967; Ph.D., Illinois, 1971.

JOHN BRUCE WILLIAMS (1969)
Medical Consultant, Professor, Student Health Service.
B.S., Kentucky, 1956; M.D., University of Louisville, 1961, M.S., 1968.

MAX BULLOCK WILLIAMS (1941)
Professor of Chemistry.
B.S., Utah, 1936, M.S., 1938; Ph.D., Cornell, 1941.

TOMMIE LEE WILLIAMS (1971)
Extension Agent-at-large (Instructor).
B.S., Alcorn A & M, 1971.

WILLIAM APPLEMAN WILLIAMS (1968)
Professor of History.
B.S., U.S. Naval Academy, 1944; M.A., Wisconsin, 1948, Ph.D., 1950.

KENNETH JAY WILLIAMSON (1973)
Assistant Professor of Civil Engineering.
B.S., Oregon State, 1968, M.S., 1970; Ph.D., Stanford, 1973.

STANLEY ELLSWORTH WILLIAMSON (1946)
Dean, School of Education; Professor of Science Education.
B.A., Nebraska Wesleyan, 1931; M.A., Columbia, 1936; Ed.D., Oregon, 1956.

DAVID LEE WILLIS (1962)
Professor of Biology, General Science; Chairman of Department.
B.Th., Biola College, 1949, B.A., 1951; B.S., Wheaton College. 1952; M.A., Long Beach State College, 1954; Ph.D., Oregon State, 1963.

TED LEROY WILLRICH (1971)
Professor of Agricultural Engineering; Extension Agricultural Engineer.
B.S., Iowa State, 1949; M.S., Oklahoma State, 1952; Ph.D., Iowa State, 1961.

CLAYTON STANLEY WILLS (1959)
Clackamas County Extension Chairman (Associate Professor).
B.S., Oregon State, 1950, M.Ed., 1957.

CHARLES OWENS WILSON (1959)
Dean of the School of Pharmacy, Professor of Pharmaceutical Chemistry.
Ph.C., Washington, 1932, B.S., 1934, M.S., 1935, Ph.D., 1938.

HOWARD LEROY WILSON (1964)
Associate Professor of Mathematics and Science Education.
B.A., Willamette, 1954; M.S., Illinois, 1960; Ph.D., 1966.

JAMES BRIAN WILSON (1973)
Assistant Professor of Forest Products.
B.S., SUNY, 1964, Ph.D., 1971.

NORMAN WILLIAM WILSON (1947)
Associate Professor Emeritus of English.
A.B., Linfield, 1930; M.A., Oregon, 1940.

ODELIA JUNGERS WILSON (1958)
Associate Professor of Music.
A.B., College of St. Teresa, 1930; M.S., Oregon, 1954.

ROBERT CLAUDE WILSON (1949)
Assistant Professor of Industrial Education.
B.S., Oregon State, 1949, Ed.M., 1955.

ROBERT ELLIOT WILSON (1957)
Professor of Mechanical Engineering.
B.S., Oregon State, 1955; M.S., Illinois, 1956; Ph.D., Oregon State, 1963.

ROBERT LEE WILSON (1952)
Associate Professor of Forest Engineering.
B.A., Iowa, 1942; M.F., Colorado State University, 1947.

SARAH JACKMAN WILSON (1966)
Archivist (Instructor).
B.A., Colorado, 1949.

STANLEY EDWARD WILSON (1972)
Assistant Professor of Chemistry.
B.A., Southern Illinois, 1966; Ph.D., Rice University, 1970.

GUSTAV HANS WILSTER (1929)
Professor Emeritus of Dairy Technology.
B.S., Iowa State, 1920, M.S., 1921, Ph.D., 1928.

CARLYN REO WINGER (1938)
Professor Emeritus of Speech Communication.
B.A., Washington State, 1928, M.A., Wisconsin, 1932.

FRED EVERETT WINGER (1947)
Professor, Business Education and Office Administration.
B.S., Nebraska, 1934; M.A., Iowa, 1938; Ed.D., Oregon, 1951.

WILLIAM LOUIS WINKENWERDER (1971)
Youth Nutrition Specialist (Assistant Professor), Cooperative Extension.
B.A., San Jose State, 1958; M.S., Oregon, 1971.

WILLIAM WINKLER, JR. (1957)
Associate Professor of Physical Education; Varsity Swimming Coach.
B.S. (Ed.), Michigan, 1955, M.S. (Ed.), 1960.

EUGENE PHILIP WINTERS (1954)
County Extension Agent (Associate Professor). Assigned to AID contract (Jordan) 1973-1975.
B.S., Oregon State, 1950; M.Ed. (Agric.), California, 1963.

RONALD HOWARD WINTERS (1968)
Associate Professor of Pharmacology and Toxicology; Assistant to the Dean.
B.A., San Fernando State, 1963; Ph.D., Oregon State, 1969.

ALMA H. WINWARD (1970)
Assistant Professor of Rangeland Resources.
B.S., Utah State, 1966; Ph.D., Idaho, 1970.

THEODORE FRANKLIN WIPRUD (1964)
Associate Professor of Art.
B.A., Washington, 1958; M.E., Central Washington State, 1962; M.F.A., Claremont Graduate School, 1964.

DAWN CHRISTINA WITHERS (1970)
Jackson County Extension Agent, 4-H and Youth (Instructor).
B.S., Oregon State, 1970.

RICHARD J. WITHYCOMBE (1968)
Instructor in Education; Director, Portland Urban Teacher Education Program.
B.S., Oregon College of Education, 1966, M.S., 1968.

JAMES McAULEY WITT (1966)
Extension Agricultural Chemist (Professor).
B.S., California, 1947, Ph.D., 1965.

FLOYD BYRON WOLBERG (1945)
Associate Professor Emeritus of Animal Science.
B.S., Wisconsin, 1928, M.S., 1932.

JOHN WILLIAM WOLFE (1947)
Professor of Agricultural Engineering.
B.S., South Dakota State, 1939; M.S., Idaho, 1940; Ph.D., Utah State, 1959; D.H.E., Delft, 1965.

MURRAY WOLFSON (1963)
Professor of Economics.
B.S., City College of New York, 1948; M.S., Wisconsin, 1951, Ph.D., 1964.

ALLEN QUAN WONG (1967)
Associate Professor of Art.
B.A., Oregon, 1943.

SALLY WONG (1973)
Counselor, Counseling Center (Instructor).
B.F.A., Texas, 1963; M.S.W., Portland State, 1969.

CARVEL W. WOOD (1968)
Associate Professor of Education.
B.S., Utah State, 1950; M.A., Stanford, 1956, Ed.D., 1967.

GREGORY BURTON WOOD (1951)
Associate Dean of Agriculture; Director, Agricultural Experiment Station; Professor of Agricultural Economics.
B.S., Oregon, 1938; M.S., Oregon State, 1940; Ph.D., Wisconsin, 1945.

JACK HENRY WOOD (1948)
Linn County Extension Agent (Associate Professor), Community Development.
B.S., Washington State, 1947; M.A., Columbia, 1958, M.S., Missouri, 1973.

MARGY JEANETTE WOODBURN (1969)
Professor and Head of Foods and Nutrition.
B.S., Illinois, 1950; M.S., Wisconsin, 1956, Ph.D., 1959.

FRANK MELVIN WOODMAN (1969)
Music Director (Instructor), KOAC Radio, Oregon Educational and Public Broadcasting Service.
B.A., San Jose State, 1956.

MURIEL J. WOODRING (1946-50, 1955)
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Research Assistant — Unclassified, Oceanography.
Assoc. of Arts, Ventura, B.S., Stanford, 1950, M.S., 1951, E.E., 1952.

Summary of Enrollment

Enrollment by Curriculum and Class, Regular Session, 1972-73

Curriculum	Freshman year	Sophomore year	Junior year	Senior year	Graduate	Special	Subtotal	Total
Liberal Arts and Sciences								
College of Liberal Arts	1,113	713	676	563	9	52	3,126	
College of Science	1,068	569	504	464	653	21	3,279	
Total, Liberal Arts and Sciences, (excluding duplicates)	2,181	1,282	1,180	1,027	662	73		6,405
Professional Curricula								
School of Agriculture	278	279	305	282	312	8	1,464	
School of Business and Technology	609	420	429	369	103	16	1,946	
School of Education	254	275	318	383	412	6	1,648	
School of Engineering	468	330	407	455	222	12	1,894	
School of Forestry	227	173	152	143	90	2	787	
School of Home Economics	328	247	229	231	94	4	1,133	
School of Oceanography	.....	.....	.....	.....	124	.....	124	
School of Pharmacy	114	106	115	158	19	.....	512	
Health and Physical Education	171	163	169	163	3	.....	669	
University Exploratory Studies Program	2	.....	.....	.....	.....	.....	2	
Unclassified	.....	.....	.....	.....	393	268	661	
Total, Professional Schools	2,451	1,993	2,124	2,184	1,772	316		10,840
Totals, (excluding duplicates)	4,632	3,275	3,304	3,211	2,434	389		17,245
Total Students, Regular Session								17,245

Summary of Degrees Conferred 1972-73

Advanced Degrees	
Doctor of Philosophy	146
Doctor of Education	29
Master of Arts	32
Master of Science	323
Master of Agriculture	7
Master of Business Administration	49
Master of Education	183
Master of Forestry	10
Master of Home Economics	2
Master of Material Science	2
Mechanical Engineer	1
Total Advanced Degrees	784
Bachelor's Degrees	
Bachelor of Arts	
College of Liberal Arts	128
College of Science	18
Business and Technology	4
Education	43
Engineering	5
Health and Physical Education	4
Home Economics	4
Pharmacy	1
Bachelor of Science	
College of Liberal Arts	370
College of Science	409
Agriculture	222
Business and Technology	359
Education	314
Engineering	345
Forestry	88
Health and Physical Education	122
Home Economics	203
Pharmacy	75
Total Bachelor's Degrees	2,714
Total Degrees Conferred 1972-73	3,498

Enrollment by Sex, All Sessions, 1972-73

Session	Men	Women	Total
Summer Term, 1972	3,128	1,929	5,057
Fall Term, 1972-73	9,595	5,614	15,209
Winter Term, 1972-73	9,357	5,441	14,798
Spring Term, 1972-73	8,847	5,281	14,128
Net Total, Regular Sessions	10,859	6,386	17,245
Net Total, All Sessions	13,987	8,312	22,299

Enrollment in Summer Term, 1972

	Men	Women	Total
Summer Term	3,128	1,929	5,057
4-H Club Short Course	302	1,137	1,439
Totals	3,430	3,066	6,496

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Directory of Offices, Schools, and Departments

Position and Officer	Building and Room	Campus Telephone
President Robert W. MacVicar, AdS A 622		1133
Vice Pres Res and Grad Studies, Roy A. Young, AdS A 312		3437
Dean of Administration, Milosh Popovich, AdS A 622		1133
Dean of Faculty, D. B. Nicodemus, AdS A 600		2111
Dean of Undergraduate Studies, S. E. Knapp, AdS A 608B		3733
Dean of Students, R. W. Chick, AdS A 220		3661
Alumni Relations, C. H. Graham, dir, MU 104		2351
Budgets, Pers Serv, R. C. Greenwood, dir, AdS A 520		1121
Business Affairs, H. F. Jeffrey Jr., dir, AdS B 100		3031
Computer Center, L. C. Hunter, dir, Computer Cntr 217		2494
Counseling Center, M. L. LeMay, dir, AdS A 322		2131
Development Officer, J. W. Dunn, AdS A 524		1218
Educ Opportunities, Dave Valencia, act dir, Waldo 324		3628
Extension Service, Joe Cox, dir., ExtH 101		2713
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Honors Program, L. J. Weber, dir, Bexell Hall 209		1459
Housing, M. E. Bryan, dir, AdS B 204		1772
Information Department, S. H. Bailey, dir, AdS A 416		1611
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Libraries, R. K. Waldron, dir, L 331A		3411
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New Student Programs, J. F. Hamm, dir, AdS A 220		3611
Placement Office, L. L. Edwards, dir, AdS B 008		1085
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Radiation Cntr, C. H. Wang, dir, RC C 100		2344
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COLLEGES, SCHOOLS, AND DEPARTMENTS

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English, W. C. Foreman, Moreland 240-C		3244
Geography, R. M. Highsmith, Wilkinson 202		3141
History, T. C. McClintock, Home Economics 303A		3421
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Political Science, D. J. Doubleday, SS 307		2811
Psychology, W. R. Crooks, Forestry 204B		2311
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Sociology, H. H. Plambeck, Fairbanks Hall 307		2641
Speech Communication, L. E. Crisp, Shepard 105		2461
College of Science, R. W. Krauss, Dean, Kidder 128		1811
Atmospheric Sciences, E. W. Hewson, Ag 329A		1557
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Botany, T. C. Moore, Cordley 2082		3451
Chemistry, D. P. Shoemaker, Gilbert Hall 122		2081
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Entomology, P. W. Oman, act chrm, Cordley 2046		1733
General Science, D. L. Willis, Weniger Hall 355		1151
Geography, R. M. Highsmith, Wilkinson 202		3141
Geology, H. E. Enlows, Wilkinson 102		2484
Mathematics, J. R. Brown, Kidder Hall 368		1686
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Science Education, F. W. Fox, Weniger 249		1031
Statistics, L. D. Calvin, Kidder Hall 44		3366
Zoology, E. J. Dornfeld, Cordley Hall 3029		1437
School of Agriculture, W. T. Cooney, Dean, Ag 126		2331
Agricultural Chemistry, V. H. Freed, Weniger 339		1345
Agricultural Economics, L. M. Eisgruber, Ext 219		2942
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Agricultural Engineering, J. R. Davis, Gilmore 100		2041
Agronomic Crop Sci, J. R. Cowan, Farm Crops 320		2894
Animal Science, J. E. Oldfield, Withycombe 106		3431
Extension Methods, G. A. Klein, Ext Hall 125		2661
Fisheries and Wildlife, C. E. Warren, Nash 104C		1531
Food Sci and Technology, P. E. Kifer, Wiegand 100		3131
Horticulture, C. J. Weiser, Cordley 2042		3695
Poultry Science, G. H. Arscott, Dryden 207		2301
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Veterinary Medicine, E. E. Wedman, Dryden 105		2141
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Mrktng, Fin, and Prod, L. B. Strickler, Bexell 418C		1297
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Div of Grad Studies in Ed, W. R. Fielder, Educ 230D		1841
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Agricultural Engineering, J. R. Davis, Gilmore 100		2041
Chemical Engineering, C. E. Wicks, ChE 103		1791
Civil Engineering, F. D. Schaumburg, Apperson 206		1934
Elec and Computer Engr, R. R. Mohler, DH 111		3617
Industrial and General Engr, J. L. Riggs, Cvl 209		1645
Mechanical and Met Engr, J. R. Welty, R 204		3441
Nuclear Engineering, C. H. Wang, RC C 100		2344
School of Forestry, C. H. Stoltenberg, Dean, Peavy 150D		2221
Forest Engineering, W. A. Davies, Peavy Hall 211		1952
Forest Management, J. R. Dilworth, Peavy 215		1951
Forest Products, Helmuth Resch, Peavy Hall 121		2017
Resource Recreation Mgmt, E. H. Heath, Peavy 068		2043
Division of Health and Phys Ed, J. W. Long, Dir, MG 216		2643
Physical Education, Charlotte L. Lambert, MG 129		2621
Health Education, W. A. Koski, Waldo Hall 307		2686
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